MX7 Reference Guide

(Microsoft® Windows® CE 5.0 Equipped)

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E-EQ-MX7RG-B

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Revision Notice

Notices	Added WEEE statement. Added trademarked statement for Summit Data Communications and Odyssey Client.
Entire Manual	Noted the replacement of SE824 scanner with SE955 scanner where applicable. Removed references to Bluetooth except to state that it is not supported.
Chapter 1 – Introduction	Added section titled "Features". Added Multi AppLock activation key instruction. Added Summit Client Desktop panel to section titled "Quick Start". "Installing Trigger Handle": Added: "*Equipment Needed*: Torque wrench capable of torquing to 3±1 in/lb (.34± .11 N/m)". Removed "and washers" from step 5 and included torque instruction in step 6. Expanded end-user instruction for voice data entry using audio cable and headsets. Accessories: Updated to reflect ROHS compliance. Added voice accessories. Removed MX7A309PSACWW. Added 9000A302PSACWW - AC/DC power supply, int'l, no power cord. Added SE955 scanner. Noted the replacement of SE824 scanner with SE955 scanner where applicable.
Chapter 2 – Physical Description and Layout	Removed statement referring to low battery warning dialog box and edited "Power Supply" section for clarification.
Chapter 3 – System Configuration	Added user information for JAVA option. Updated battery charge panels – Battery Panel and Power Panel. Updated scanner panels with barcode wedge enhancement. Moved Odyssey Client menu information and Summit Client menu information from "Start | Control Panel" section to Chapter 5 "Wireless Network Configuration". Corrected Order statement for Utilities | LXE Login Install and LXE Login. Updated "LAUNCH.EXE" persist settings. Added new sections to Utilities: "Enabling GrabTime", "Configuring CapsLock Behavior", "Launch App / Launch Command" and "Configuring IPv6". Added Summit Client panel to section titled "Network and Dial-Up Connections".
Chapter 4 – AppLock	Added Multi AppLock instruction.
Chapter 5 – Wireless Network Configuration	Added instruction for Summit Client Utility software. Odyssey Client: Added instructions for setting No Security and WEP-LEAP. Instructions for LEAP with WPA are included in section for EAP-LEAP.
Appendix A – Keymaps	Added section titled "Creating Custom Keymaps".
Appendix B – Technical Specifications	Added technical specifications for the *LXE CF Radio in PCMCIA Adapter card*. Added note about SE955 scanner replacing SE824 scanner where applicable.

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Chapter 1 Introduction

Overview

The LXE MX7 is a rugged, portable, hand-held Microsoft® Windows® CE 5.0 equipped mobile computer capable of wireless data communications. The mobile device can transmit information using an 802.11 radio and it can store information for later transmission through an RS-232 or USB port.

The mobile device is vertically oriented and features backlighting for the display. The touch-screen display supports graphic features and Windows icons that the Windows CE 5.0 operating system supports. Keypads are available in 55-key alphanumeric and 32-key numeric-alpha versions. Also available is an IBM 5250 55-key keypad overlay.

This device is a Windows CE 5.0 compatible computer that can be scaled from a limited function batch computer to an integrated RF scanning computer. A trigger handle is available as an accessory.

The attached stylus is used to assist in entering data and configuring the mobile device. Protective film for the touchscreen is available as an accessory.

The MX7 is powered by a 2200 mAh Lithium-Ion main battery pack and an internal NiCd backup battery.

Important

If the mobile device has AppLock installed, please refer to “Chapter 4 – AppLock” for setup and processing information.

Wireless configuration and security parameters are described in detail in “Chapter 5 – Wireless Network Configuration”.

Features

New features affect user interaction and internal operation of the MX7.

The appropriate radio utililty for your device configuration has been pre-installed by LXE. The desktop will display an *Odyssey Client Utility* icon or it will display a *Summit Client Utility* icon for 802.11 configuration and security.

	Odyssey	Summit	Optional?
LXE 802.11 b/g Radio / Summit Client Utility	-	x	No
LXE 802.11 b/g Radio / Odyssey Client Utility	x	-	No
400MHz	x	x	No
128MB RAM	x	x	No
128MB Flash	x	x	No
SE955 Scanner	-	x	Yes
EV-15 Scanner	x	x	Yes
SE824 Scanner	x	-	Yes
CE 5.0	x	x	No
Voice	-	x	Yes
RFTerm	x	x	Yes
JAVA	x	x	Yes
AppLock	x	x	Yes
Multi AppLock	x	x	Yes

Important Battery Information

Note: The mobile device's backup battery maintains its charge by drawing power from the main battery pack. Always store unused devices with a fully charged main battery pack installed. LXE recommends an in-use mobile device be frequently connected to an external power source to maintain optimum power levels in the main battery pack and the backup battery. When the backup battery and main battery pack are dead, the mobile device reverts to the last saved setup defaults when a fully charged main battery pack is installed and the device is powered On again.

Tap | **Settings** | **Control Panel** | **Battery** tab.

- Until the main battery and backup battery are completely depleted, the MX7 is always drawing power from the batteries (On).
- New batteries must be fully charged prior to use.
- Whenever possible, use the AC power adapter with the MX7 to conserve the main battery and recharge the backup battery.
- When a new battery is installed in the MX7 for the first time (or when the backup battery is completely depleted), the Time and Date reverts to its default values.

Tap | **Settings** | **Control Panel** | **Date/Time** tab.

Note: Power drain increases substantially in Turbo mode (| Settings | Control Panel | Power).

When to Use This Guide

As the reference for LXE's MX7 computer, this guide provides detailed information on its features and functionality. Use this reference guide as you would any other source book – reading portions to learn about the MX7, and then referring to it when you need more information about a particular subject. This guide takes you through all aspects of installation and configuration for the LXE MX7.

Operation and safety instructions for the general user are contained in the "MX7 User's Guide."

This chapter, **"Introduction",** describes this reference guide's structure, contains initial setup instruction, briefly describes data entry processes, and explains how to get help.

Chapter 2 "Physical Description and Layout", describes the function and layout of the MX7 components, controls and connectors. Also describes the external power supplies and vehicle mounting options for the MX7.

Chapter 3 "System Configuration" takes you through the CE 5.0 operating system setup and the MX7 file structure. Also describes and explains initial ActiveSync processes, MX7 specific utilities and the LXE Login Utility.

Chapter 4 "AppLock" covers all aspects of the LXE AppLock program.

Chapter 5 "Wireless Network Configuration" details 2.4GHz radio setup. Configuration for WEP and WPA is included.

Appendix A "Key Maps" describes the keypress sequences for the keypad. Custom Keymapping instruction is included.

Appendix B "Technical Specifications" lists MX7 technical specifications.

Document Conventions

ALL CAPS	All caps are used to represent disk directories, file names, and application names.
Menu | Choice	Rather than use the phrase “choose the Save command from the File menu”, this manual uses the convention “choose File | Save”.
“Quotes”	Indicates the title of a book, chapter or a section within a chapter (for example, “Document Conventions”).
< >	Indicates a key on the keypad (for example, <Enter>).
	Indicates a reference to other documentation.
ATTENTION	Keyword that indicates vital or pivotal information to follow.
	Attention symbol that indicates vital or pivotal information to follow. Also, when marked on product, means to refer to the manual or user’s guide.
	International fuse replacement symbol. When marked on the product, the label includes fuse ratings in volts (v) and amperes (a) for the product.
Note:	Keyword that indicates immediately relevant information.
CAUTION	Keyword that indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
WARNING	Keyword that indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
DANGER	Keyword that indicates a imminent hazardous situation which, if not avoided, will result in death or serious injury.

Components

Front

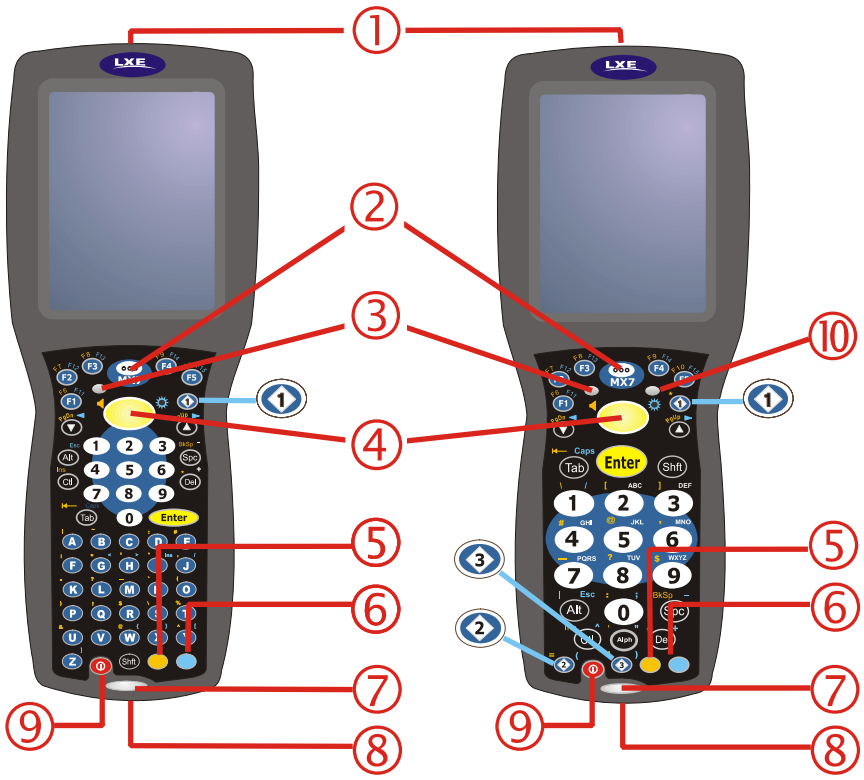


Figure 1-1 Front of MX7

1	Scanner Aperture
2	Speaker
3	System Status LED
4	Scan Button
5	Orange Key (Sticky Key)
6	Blue Key (Sticky Key)
7	Scan Status LED
8	Cable Port
9	On / Off Button
10	“Alpha” Lock LED
	Diamond Number Keys

Back

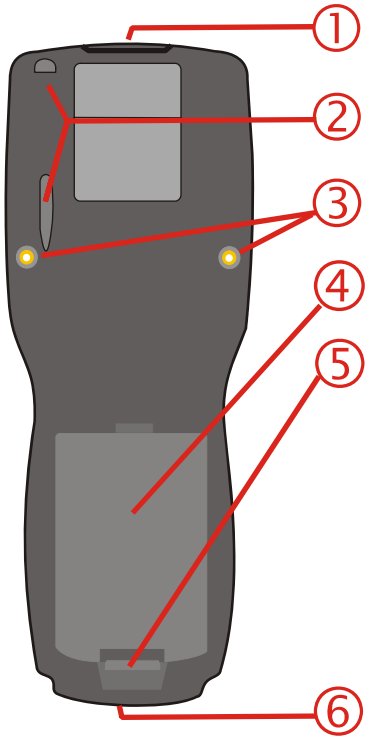


Figure 1-2 Back

1	Scanner Aperture	4	Main Battery
2	Stylus and Stylus Pocket	5	Battery Fastener
3	Trigger Handle Attach Points	6	Cable Port

Scanner / Imager Aperture

Figure 1-3 Scanner Aperture

Note: The Imager has clear plastic protecting the imager engine. The Scanner has red plastic protecting the scanner engine. The No-Scanner option has an opaque window protecting the MX7 internal components.

I/O Port and Cables

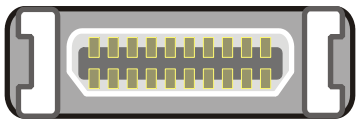


Figure 1-4 I/O Port and Cables

Cable: Multipurpose RS-232 and Power

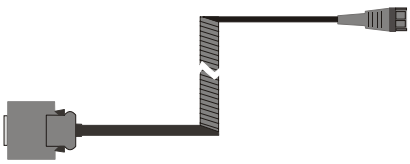
MX7A055MULTICBLDA9F

Cable: Multipurpose USB and Power

MX7A052MULTICBLUSB

Adapter/Cable : Audio

MX7A060ADPTCBLVOICE



Adapter: RS-232 PC port to D9 male

MX7A058ADPTCBLPER

Note: There is no IR port on the MX7. Tethered scanners are not supported on the MX7.

Trigger Handle

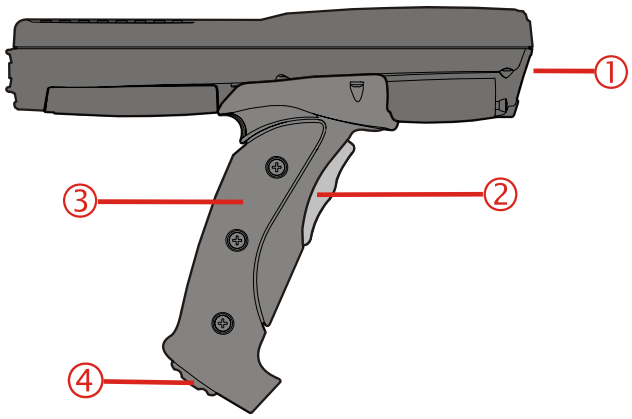


Figure 1-5 Handle (Optional)

1	Scan Aperture	3	Handle
2	Trigger	4	Tether Attach Point

Handstrap

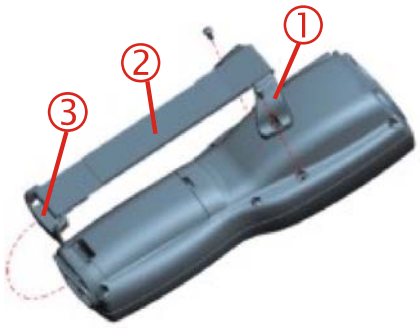


Figure 1-6 Handstrap (Optional)

1 Handstrap Retainer Bracket

2 Handstrap

3 Handstrap Clip

Note: Either the trigger handle is attached to the MX7 or the handstrap is attached, not both. LXE recommends that, in the absence of a trigger handle, the handstrap be used at all times.

Quick Start

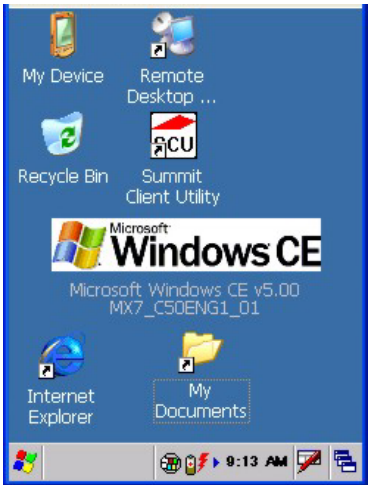
Note: When your mobile device is pre-configured, the radio, keypad and scan aperture configurations are assembled by LXE to your specifications. The desktop will display an Odyssey Client Utility *icon or it will display a* Summit Client Utility *icon.*

This section's instructions are based on the assumption that your new system is pre-configured and requires only accessory installation (e.g. handstrap) and a power source. LXE recommends that installation or removal of accessories be performed on a clean, well-lit surface. When necessary, protect the work surface, MX7, and components from electrostatic discharge.

In general, the sequence of events is:

1. Insert a fully charged battery. (Always put a fully charged battery in the MX7 at the beginning of the shift or workday.)
2. Connect an external power source to the unit (if available).
3. If the screen does not automatically display, tap the Power key.
4. Calibrate the touchscreen.
5. A white screen will appear during the boot process until all CAB files and applications are loaded and installed. Radio setup screens may appear and disappear while files are loading.
6. After all files are loaded and the Microsoft Windows CE Desktop is displayed, adjust audio volume and other parameters if desired.

MX7 with Odyssey Client



MX7 with Summit Client

Figure 1-7 MX7 Desktop

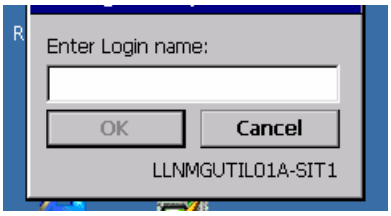
If needed, change the Time and Date from its default value by tapping the | **Settings | Control Panel | Date/Time** icon.

Related Manuals

Instructions for setting up the integrated **SE824, SE955 or SE1524 scanner barcode reading parameters,** are contained in Chapter 2 in the "Integrated Scanner Programming Guide" on the LXE Manuals CD or the LXE ServicePass website. *Note: The SE 955 scanner replaced the SE 824 scanner on all MX7's manufactured after July 2006.*

For instructions on setting up the **Intermec EV15 linear imager**, please refer to Chapter 3 in the "Integrated Scanner Programming Guide".

Troubleshooting

Can't calibrate the touch screen, change the date/time or adjust the volume.	AppLock is installed and running on the mobile device. AppLock restricts User access to running programs. Changes or modifications require Administrator access. Refer to "Chapter 4 - AppLock" for setup and processing information.	
RFTerm opens and runs upon each cold reset and warm reset.	Tap File | Exit to close the RFTerm application.	
The Login utility waits for a login name before the MX7 can continue. **For devices with an Odyssey Client only.**		If the LXE Login Utility has been installed, a login screen is presented to the user after a return from Suspend, a warm reset and a cold reset. Type the login name and tap OK to continue. Tap Cancel to use the previously entered user name. Refer to Chapter 3 "System Configuration", section titled "LXE Login Utility."

Entering the Multi AppLock Activation Key

See Also: Chapter 4 "AppLock".

Hotkey

If the mobile device uses LXE's Multi AppLock to allow the user to switch between two applications, the default Activation key is **Ctrl+Spc**. The key sequence switches the focus between one application and another. Data entry affects the application running in the foreground only. *Note that the system administrator may have assigned a different key sequence to use when switching applications*.

Touch

Tap the taskbar icon to place the popup menu on screen. Tap one of the application icons in the popup menu. The selected application is brought to the foreground while the other application continues to run in the background. Stylus taps affect the application running in the foreground only.

Hardware Setup

Installing Trigger Handle (Optional)

The MX7 can be purchased with a customer-installable pistol grip handle. The handle enables the user of the MX7 to hold the unit while pointing and activating the scanner with the trigger on the handle. Pressing the trigger activates the scanner and functions the same as the Scan key on the keypad. With the handle installed the Scan key on the keypad remains active. The trigger duplicates the operation.

The handle is built of a durable and flexible plastic that will not detach from the MX7 if the unit is dropped. The trigger handle is a mechanical device. Battery or external A/C power is not required for operation of the trigger handle. The trigger handle does not need to be removed when replacing the main battery pack.

Either the trigger handle is attached to the MX7 or the handstrap is attached, but not both.

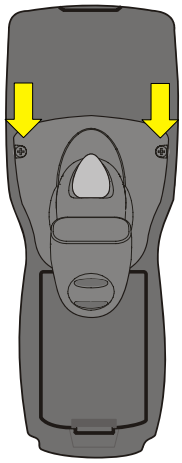


Figure 1-8 Trigger Handle Attach Points

Handle Installation

Equipment Needed: Torque wrench capable of torquing to 3±1 in/lb (.34± .11 N/m) .

1. Place the MX7, with the screen facing down, on a flat stable surface.
2. Remove the main battery pack.
3. Slide the locking tab on the underside of the pistol grip into the slot at the back of the battery compartment and press it firmly into place.
4. Ensure that the battery can be inserted into the battery compartment before securing the pistol grip handle into place.
5. Attach the pistol grip handle to the MX7 (as shown above) with the two screws provided.
6. Torque the Pan Head Screws to 3±1 in/lb (.34±.11 N/m).
7. Test the handle's connection making sure the MX7 is securely connected to the handle.

Periodically check the pistol grip handle for wear and the connection for tightness. If the handle gets worn or damaged, it must be replaced. If the pistol grip connection loosens, it must be tightened before the MX7 is placed in service.

Inserting the Main Battery

Press the Power key after the battery is inserted into the MX7.

Note: On first use the MX7 batteries should be charged with an external power source (i.e. AC Adapter) – 3.5 hours for the main battery and 7 hours for the backup battery. New main battery packs alone must be charged prior to first use – this process takes up to four hours in an LXE Multi-Charger.

Figure 1-9 Main Battery Pack

The MX7 Battery Compartment is located at the bottom of the back of the computer.

Place the battery in the battery well, making sure the tab on the bottom of the battery pack fits into the slot at the bottom end of the battery well. Push the battery down into the battery well until the tab clicks into place and the battery pack is secure in the battery well.

The backup battery is trickle-charged by the main battery. Whenever possible, use the AC power adapter with the MX7 to conserve the main battery and charge the backup battery.

The Status LED indicates battery condition. It is steady red when the main battery is Low. When the battery has sufficient energy the Status LED is unlit. The Battery control panel displays main and backup battery charging and power status (Start | Settings | Control Panel | Battery).

About Lithium-Ion Batteries

Li-Ion batteries (like all batteries) gradually lose their capacity over time (in a linear fashion) and never just stop working. This is important to remember – the MX7 is always 'on' even when in the Suspend state and draws power from the batteries at all times. Tap the **| Settings | Control Panel | Power** tab to check the battery status and power reading.

The following chart is an approximation. Actual battery capacity varies based on usage, ambient temperature and peripherals drawing power from the MX7:

100% capacity	2200 mAh minimum
80% capacity	1760 mAh minimum

Deciding when to put a fully charged main battery pack in the MX7 is difficult to quantify because it is very application specific. 1800 mAh may be the cutoff for one customer who uses the mobile device frequently, while 1000 mAh may be perfectly fine for a customer who occasionally uses the mobile device. You need to determine the point at which battery life becomes unacceptable for your business practices and replace the main battery pack before that point.

Installing the Handstrap

Note: The handstrap cannot be used/installed when the MX7 has the trigger handle installed at the same time.

An elastic hand strap is available for the MX7. Once installed, the hand strap provides a means for the user to secure the computer to their hand. It is adjustable to fit practically any size hand and is easily moved to allow installation or removal of the battery pack.

Note: Slide the bottom bracket out and away from the MX7 when replacing the main battery pack.

Figure 1-10 MX7 With Handstrap Installed

Tool Required: #1 Phillips Screwdriver (not supplied by LXE)

Installation

1. Place the MX7, with the screen facing down, on a flat stable surface.
2. Attach the handstrap retainer bracket to the MX7 with the screws provided.
3. Slip the Handstrap Clip into the bracket at the base of the MX7.
4. Making sure the closed loop fastener surfaces on the handstrap are facing up, slide the strap through the pin in the retainer bracket and the clip.
5. Fold each end of the strap over so that the closed loop fastener surfaces mate evenly.
6. Test the strap's connection making sure the MX7 is securely connected to each end of the strap connectors.

Check the closed loop fastener, retainer bracket and clip connections frequently. If they have loosened, they must be tightened before the MX7 is placed into service again.

Periodically check the handstrap for wear and the connection for tightness. If the handstrap gets worn or damaged, it must be replaced.

Connecting an External Power Supply (Optional)

The MX7 receives AC/DC power from the AC/DC 12V Power Supply. The MX7 external power connection is part of the RS-232 cable assembly and the USB cable assembly.

Putting it all together ….

Figure 1-11 USB – MX7 – Power Assembly

1. Squeeze the sides of the power connector and push the power cable connector into the MX7 port until it clicks. The click means the connector is seated firmly.

2. The System LED above the Scan key illuminates when the MX7 is charging the main battery pack using external power through the power cable. The backup battery is always being trickle charged by the main battery pack..

Whenever possible, use the AC power adapter with the MX7 to conserve the main battery power and maintain a charge in the backup battery.

Assembling the AC Power Adapter

The LXE-approved AC Power Adapter is only intended for use in a 25°C (77°F) maximum ambient temperature environment.

If the AC power cable is not included with the AC Adapter, please contact your LXE representative for assistance.

Figure 1-12 AC/DC 12V External Power Supply

- Firmly press the female end of the power cable into the male connector on the power adapter.
- Plug the 3-prong cable into an AC wall outlet. AC power is now being supplied to the power adapter.

Press the power cable connector pin from the power adapter into the connector on the (USB/Power or RS-232/Power) cable attached to the base of the MX7. AC power is now being supplied to the MX7.

Connecting the Multipurpose USB / Power Cable

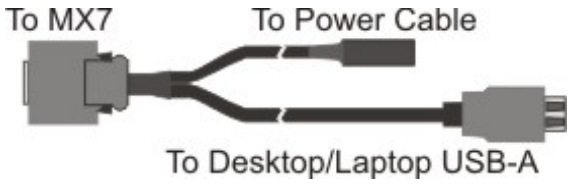


Figure 1-13 Connect the USB / Power Cable to the MX7 Port

Connector A — Squeeze the clips on the connector cable to open the catches in the connector assembly. Firmly press Connector A into the connector at the base of the MX7. Release the clips in the connector cable. Test the connection for stability before connecting the B or C connector.

Connector B — Firmly push the power cable connector pin into connector B until you hear a slight click. Plug the 3-prong cable into an AC wall outlet.

Connector C — Insert the USB Type A plug into an appropriate USB port on a desktop/laptop computer for ActiveSync communication.

Connecting the Multipurpose RS-232 / Power Cable

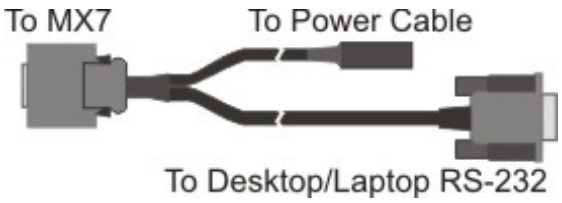


Figure 1-14 Connect the RS-232 / Power Cable to the MX7 Port

Connector A — Squeeze the clips on the connector cable to open the catches in the connector assembly. Firmly press Connector A into the connector at the base of the MX7. Release the clips in the connector cable. Test the connection for stability before connecting the B or C connector.

Connector B — Firmly push the power cable connector pin into connector B until you hear a slight click. Plug the 3-prong cable into an AC wall outlet.

Connector C — Align the RS-232 serial cable end carefully to an appropriate serial port on a desktop/laptop computer for ActiveSync communication. Press the ends together and hand tighten the screws on either side of the serial cable until the MX7 is securely connected to the serial device.

Connecting to a Printer Interface Cable

Figure 1-15 Connect to a Printer Interface Cable

Connector A — Squeeze the clips on the connector cable to open the catches in the connector assembly. Firmly press Connector A into the connector at the base of the MX7. Release the clips in the connector cable. Test the connection for stability before connecting the B or C connector.

Connector B — Align the RS-232 serial cable end carefully to the serial port on the cable from the printer. Press the ends together and hand tighten the screws on either side of the serial cable until it is securely connected to the printer cable.

Connecting the Audio Cable and a Headset

See section titled “Set the Audio Speaker Volume”.

Note: The audio option draws power from the main battery.

The headset consists of an earpiece, a microphone and an attached cable. The headset attaches to the audio cable which attaches to the MX7. Use the control panel option “Mixer” to set up mono or stereo headphones. The Summit Client supports mono only.

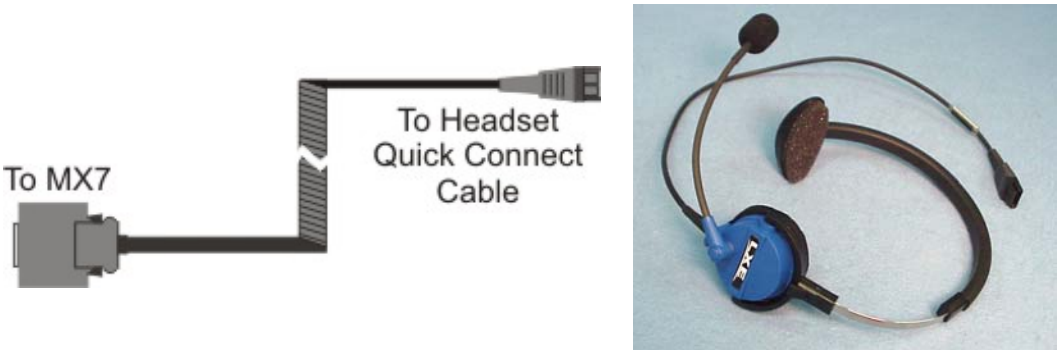


Figure 1-16 Audio Cable and Headset

Connector A — Squeeze the clips on the connector cable to open the catches in the connector assembly. Firmly press Connector A into the connector at the base of the MX7. Release the clips in the connector cable. Test the connection for stability before connecting the B connector.

Connector B — Align Connector B and the headset quick connect cable end. Firmly push the cable ends together until they click and lock in place.

Adjust Microphone and Secure the Cable

Do not twist the microphone boom when adjusting the microphone.

The microphone should be adjusted to be about two finger widths from your mouth.

Make sure the microphone is pointed at your mouth. Note the small "Talk" label near the mouthpiece. Make sure the Talk label is in front of your mouth.

The microphone cable can be routed over or under clothing.

Under Clothing

- Leave the cable exposed only at the top of the collar.
- Be sure to leave a small loop of cable to allow movement of your head.

Over Clothing

- Use clothing clips to hold the cable close to your body.
- Tuck the cable under the belt, but leave a small loop where it goes under the belt.
- Do not wear the cable on the front of your body. It may get in your way or get caught on protruding objects.

Entering Data

Data is entered into the MX7 by speaking into the headset's microphone when prompted.

Please contact your System Administrator if assistance is needed with the voice software installed on your MX7.

Power Key

Note: Refer to the section titled "Power Modes" later in this guide for information relating to the power states of the MX7.

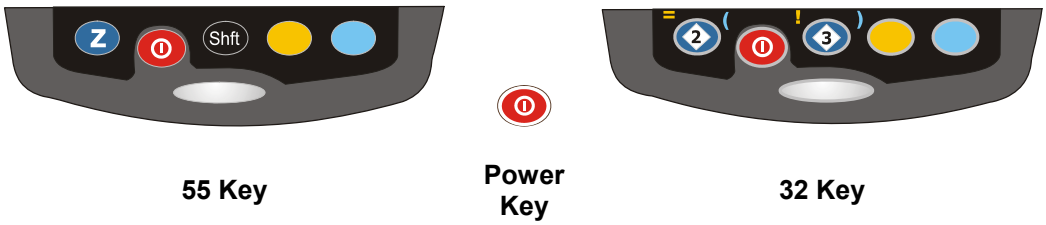


Figure 1-17 Power Key Location

The Power key is located at the bottom of the keypad. When a battery is inserted in the MX7 for the first time press the Power key.

Tapping the Power key places the MX7 immediately in Suspend mode. Tapping the Power key again immediately releases the MX7 from Suspend Mode.

Or

Tap | **Suspend**.

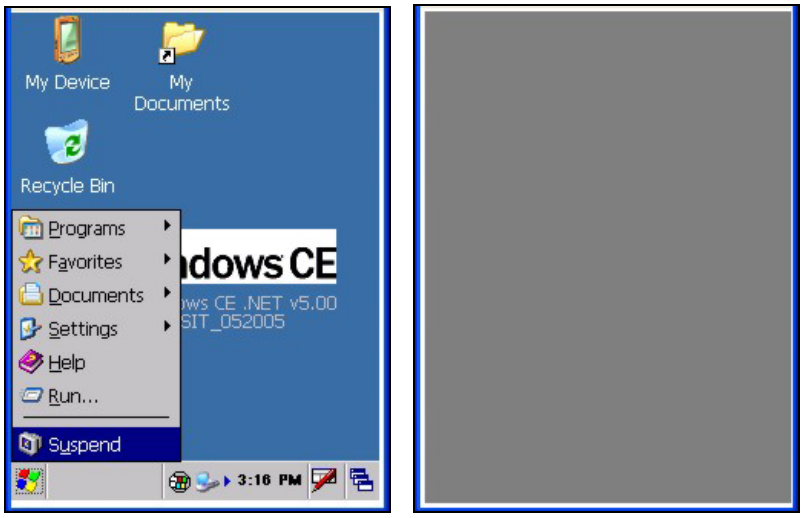


Figure 1-18 Enter Suspend Mode – Press Enter

Please refer to the section titled "Power Key" in Chapter 2 for Reboot options and instruction.

See section "LED Indicators" and "System Status LED" later in this guide.

Tapping the Touchscreen with a Stylus

Note: Always use the point of the stylus for tapping or making strokes on the display. Never use an actual pen, pencil, sharp or abrasive object to write on the touchscreen.

Hold the stylus as if it were a pen or pencil. Touch an element on the screen with the tip of the stylus then remove the stylus from the screen. Place the stylus into the stylus holder on the MX7 when the stylus is not in use.

Like using a mouse to left-click icons on a laptop/desktop computer screen, using the stylus to tap icons on the MX7 display is the basic action that can:

- Open applications
- Choose menu commands
- Select options in dialog boxes or drop-down boxes
- Drag the slider in a scroll bar
- Select text by dragging the stylus across the text
- Place the cursor in a text box prior to typing in data or retrieving data using the integrated barcode scanner or an input/output device connected to the serial port.
- A mouse right-click is performed by holding the stylus down on the touchscreen. A circle of dots appear and then the right-click operation can be performed. See note.

Note: A "right mouse click" function must be programmed by the customer to accept a Tap and Hold function. An application can choose to interpret this function as a right mouse click. LXE does not support non-LXE application programming.

Keypad Shortcuts

Use keyboard shortcuts instead of the stylus.

- Press Tab and an Arrow key to select a file.
- Press Shift and an Arrow key to select several files.
- Once you've selected a file, press Alt then press Enter to open its Properties dialog.
- Press Del to delete a file.
- To force the Start menu to display, press Ctl and release, press Blue and release, then press Esc (the Alt key).

A stylus replacement kit containing 10 stylus' can be ordered from LXE. See the section titled "Accessories" for the stylus replacement kit part number.

Software Setup

Touchscreen Calibration

Note: The first time it is used, the MX7 automatically runs the touchscreen calibration program.

If the MX7 is not responding properly to stylus touch taps, the touchscreen may need to be recalibrated.

To recalibrate the screen, tap the | **Settings | Control Panel | Stylus | Calibration** tab.

Tap the **Recalibrate** button. Follow the instructions on the screen and press the Enter key to save the new calibration settings or press <Esc> to cancel or quit.

Set Time Zone (Optional)

Note: The first time it is used, or the device returns from a Cold Reset, the MX7 resets Date and Time to the factory default values.

To set the Time Zone, tap the **| Settings | Control Panel | Date/Time icon**.

Select the physical time zone. Enable the checkbox next to "Automatically adjust clock for daylight saving" if applicable.

Adjust the time and calendar date and tap Apply. Tap OK when you are finished or X to ignore any changes.

Enter Owner Information (Optional)

Use the virtual keyboard or keys on the keypad to enter the following data.

To set Owner information, tap the **| Settings | Control Panel | Owner** icon.

Select the **Identification** tab, and enter Name, Company, Address, and telephone numbers. Enable the "Display owner identification" checkbox if you want this information displayed each time the system powers on.

Select the **Notes** tab, enter a note to see at power on. Enable the "display owner notes" checkbox to see the note at power on.

Select the **Network ID** tab and enter the User Name, Password and Domain.

Tap OK when finished or X to ignore any changes.

Set the Display Backlight Timer

Note: Refer to the section titled "Power Modes" later in this manual for information relating to the power states of the MX7.

Select | **Settings | Control Panel | Display | Backlight** tab. Change the parameter values and tap OK to save the changes.

The first option affects the MX7 when it is running on battery power only. The second option affects the MX7 when it is running on external power (e.g. AC adapter, powered vehicle or desktop cradle).

The default value for the battery power timer is 5 seconds. The default value for the external power timer is "never" and the checkbox is blank. **The backlight will remain on all the time when both checkboxes are blank.**

The color display backlight timer dims the backlight at the end of the specified time.

Set the MX7 Power Schemes Timers

Note: Refer to the section titled "Power Modes" later in this guide for information relating to the power states of the MX7.

Select | **Settings | Control Panel | Power | Schemes** tab. Change the parameter values and tap OK to save the changes.

Battery Power Scheme

Use this option when the MX7 will be running on battery power only.

Switch state to User Idle:	Default is After 3 seconds
Switch state to System Idle:	Default is After 15 seconds
Switch state to Suspend:	Default is After 5 minutes

AC Power Scheme

Use this option when the MX7 will be running on external power.

Switch state to User Idle:	Default is After 2 minute
Switch state to System Idle:	Default is After 2 minutes
Switch state to Suspend:	Default is After 5 minutes

These mode timers are cumulative. The System Idle timer begins the countdown after the User Idle timer has expired and the Suspend timer begins the countdown after the System Idle timer has expired. When the User Idle timer is set to "Never", the power scheme timers never place the device in User Idle, System Idle or Suspend modes (even when the device is idle).

Because of the cumulative effect, and using the Battery Power Scheme defaults listed above:

- The backlight turns off after 3 seconds of no activity,
- The display turns off after 18 seconds of no activity (15sec + 3sec),
- And the device enters Suspend after 5 minutes and 18 seconds of no activity.

Set The Audio Speaker Volume

Note: An application may override the control of the speaker volume. Turning off sounds saves power and prolongs battery life.

Figure 1-19 Speaker Location

The speaker is located on the front of the device above the MX7 logo. The audio volume can be adjusted to a comfortable level for the listener. The volume is increased or decreased one step each time the volume key sequence is pressed. The device has an internal speaker and a jack for an external headset. Operational "beeps" are emitted from the speaker.

Using the Keypad

Note: Volume & Sounds (in Control Panel) must be enabled before the following key sequences will adjust the volume.

To adjust speaker volume:

- Tap the **Orange** key then the **Scan** key to enter Volume change mode.
- Use the **Up Arrow** and **Down Arrow** keys to adjust volume until the speaker volume is satisfactory.
- Press the **Enter** key to exit this mode.

Using the Touchscreen

Tap the | **Settings** | **Control Panel** | **Volume & Sounds** | **Volume** tab**.**

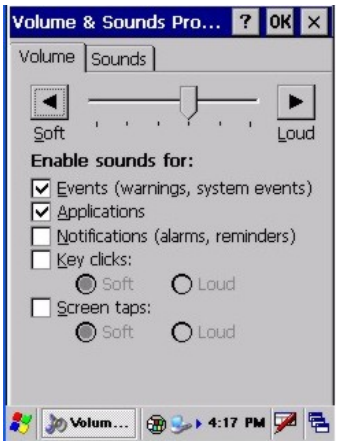


Figure 1-20 Volume & Sounds Properties

Change the volume setting and tap OK to save the change. You can also select / deselect sounds for key clicks and screen taps and whether each is loud or soft.

As the volume scrollbar is moved between Loud and Soft, the computer will emit a tone each time the volume increases or decreases in decibel range.

Applying the Protective Film to the Display

First, clean the display of fingerprints, lint particles, dust and smudges.

Remove the protective film from its container. Remove any protective backing from the film sheet by lifting the backing from a corner of the film. Discard the backing.

Apply the film to the screen starting at one side and smoothing it across the display. If air bubbles appear, raise the film slightly and continue smoothing the film across the display until it covers the glass surface of the display.

If dust, lint or smudges are trapped between the protective film and the glass display, remove the protective film, clean the display and apply the protective film again.

Copy the MX7 LXEbook to the MX7 (Optional)

Note: The LXEbook user guides do not contain the illustrations and regulatory information contained in the full user guides on the LXE Manuals CD and on the LXE ServicePass website. See the full format User Guide"MX7 User's Guide" on the LXE Manuals CD.

Mobile Device	Required Adobe Acrobat Reader Version
MX7	Windows CE PDF Viewer (pre-installed).

First, using your desktop computer download "LXEbook – MX7 Users Guide" from the LXE Manuals CD to your desktop computer.

Next, refer to "ActiveSync Processes" and "Initial Install" in Chapter 3 of this guide before connecting the MX7 to your PC.

When the MX7 and the desktop ActiveSync applications are synchronized, tap Explore on the ActiveSync menu on your PC to display the contents of the MX7 folders.

Then, open the folder on your desktop computer containing the downloaded LXEbook. Tap and drag the LXEbook to the My Documents folder on the MX7.

When the file copy process is finished, disconnect the MX7 from the synchronization equipment and close ActiveSync.

To view the LXEbook on the MX7, select Start / Programs / Microsoft File Viewers / Microsoft PDF Viewer / File / Open. Locate the LXEbook on the MX7 and "open" the file.

See Also: "Install LXEbooks" on the LXE Manuals CD.

Radio and Network Setup

Prerequisites

- Network SSID or ESSID number of the Access Point
- WEP or LEAP Authentication Protocol Keys

Note: If the access point uses authentication protocol (LEAP, WEP etc.) your radio must use the same authentication keys. Please contact your IS department for WEP or LEAP encryption keys before contacting LXE. WEP and LEAP are authentication protocols used to encrypt data sent and received from the mobile device to the access point. WEP is disabled by default.

Note: The MX7 may use either the Funk Odyssey Client or the Summit Client Utility to configure the radio.

When the MX7 boots up for the first time and all programs are loaded, the Wireless Information window may appear. The radio is attempting to connect to the local network.

Please refer to Chapter 5 "Wireless Network Configuration" to continue setting up the radio and network.

Terminal Emulation Setup

Prerequisites

- the mobile client network settings are configured and functional
- the alias name or IP address (Host Address) and
- the port number (Telnet Port) of the host system

Make sure the mobile client network settings are configured and functional. If you are connecting over wireless LAN (802.11B), make sure your mobile client is communicating with the Access Point.

1. From the | **Programs**, run **LXE RFTerm** or tap the **RFTerm** icon on the desktop.
2. Select **Session | Configure** from the application menu and select the "host type" that you require. This will depend on the type of host system that you are going to connect to; i.e. 3270 mainframe, AS/400 5250 server or VT host.
3. Enter the "Host Address" of the host system that you wish to connect to. This may either be a DNS name or an IP address of the host system.
4. Update the telnet port number, if your host application is configured to listen on a specific port. If not, just use the default telnet port.
5. Select **OK**
6. Select **Session | Connect** from the application menu or tap the "Connect" button on the Command Bar. Upon a successful connection, you should see the host application screen displayed.

To change options such as Display, Colors, Cursor, Barcode, etc., please refer to the "RFTerm Reference Guide" on the LXE Manuals CD.

Installing User Certificates and Private Keys

Date/Time	It is important that all dates are correct on CE and desktop/laptop computers when using any type of certificate. Certificates are date sensitive and if the date is not correct authentication will fail.

Access: | **Settings | Control Panel | Certificates**

Prerequisites:

- The MX7 has the correct Date and Time. See Chapter 3, section titled "Date/Time."
- A User Certificate file is available
- A Private Key file is available

First, using ActiveSync, copy the User Certificate file and the Private Key file to the mobile device's persistent file location.

A persistent file location does not get erased when the mobile device performs a warm or cold reset. For example, the internal flash folder.

Next, place a copy of the User Certificate file and the Private Key file in the My Device\System folder. The certificate and key files should display in the Certificates and Authentication applet windows.

Note: After the MX7 is reflashed with a new operating system, the User Certificate and Private Key files must be re-installed and re-authenticated.

User Certificate

To check if a user certificate is installed navigate to **Start** | **Settings** | **Control Panel** | **Certificates**.

Set the drop down box to “My Certificates” as shown below.

The correct user certificate should be shown in the right pane.

Tap the **Import** button to import a digital certificate file.

Tap the **View** button to view a highlighted digital certificate.

Tap the **Remove** button to remove highlighted certificate files.

Tap the “?” button and follow the instructions in the Help file when working with trusted authorities and digital certificates.

Figure 1-21 Certificate | Stores

Private Key

Tap the **View . . .** button.

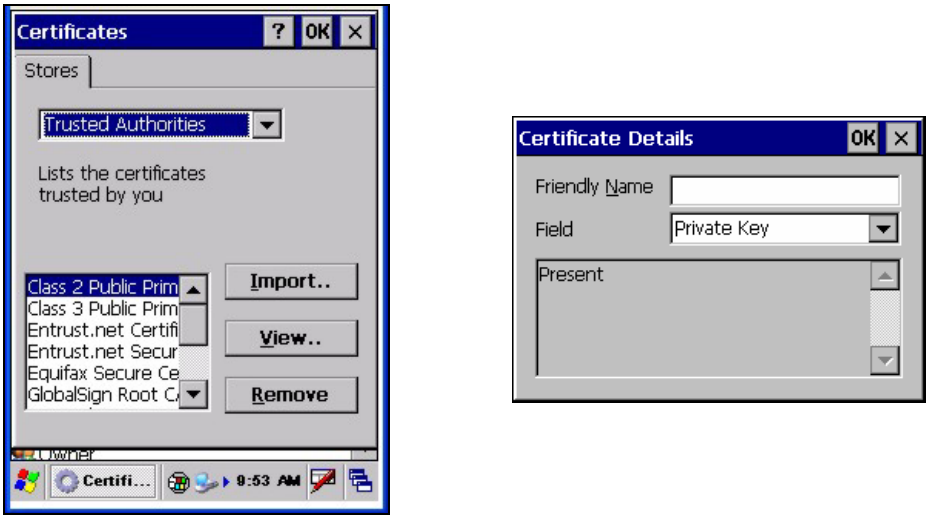


Figure 1-22 View Certificate Details

Set the **Field** to Private Key.

Make sure the private key is “Present.”

If it is not present, install the private key file. See Chapter 5 “Wireless Network Configuration”.

Entering Data

You can enter data into the MX7 through several different methods. The Scanner aperture provides barcode data entry, the I/O port is used to input/output data, and the keypad provides manual entry.

Mobile devices with a touchscreen use a stylus to input data, the I/O port and/or the keypad. An input panel (virtual keyboard) is available in applications that expect keyed input.

Using the Keypad

The keypad is used to manually input data that is not collected otherwise. Almost any function that a full sized computer keyboard can provide is duplicated on the MX7 keypads but it may take a few more keystrokes to accomplish a keyed task. Please refer to "Appendix A – Key Maps" for instruction on the specific keypresses to access all keypad functions.

Almost every key has two or three different functions. The primary alpha or numeric character is printed on the key.

The Orange or Blue keys are pressed when you want to use a "sticky" key function. For example, when you press a Blue or Orange key (the sticky key), then press the key that has the desired second-function key, the second-function key is the "active" key. The specific sticky character is printed above the corresponding key in either Orange or Blue.

Using the Input Panel or Virtual Keyboard

The virtual keyboard is always available when needed e.g. text field input. Tap the keyboard icon at the bottom of the screen to put the virtual keyboard on the display. Using the stylus:

- Tap the Shift key to type one capital letter.
- Tap the CAPS key to type all capital letters.
- Tap the au key to access symbols.

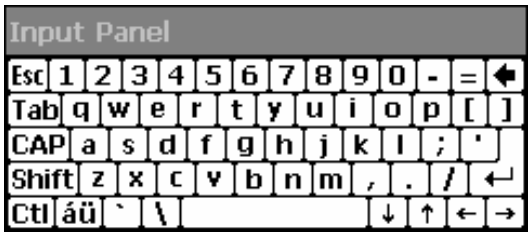


Figure 1-23 Input Panel / Virtual Keyboard

Some applications do not automatically display the Input Panel. In this case, do the following to use the Input Panel:

1. Tap the Input Panel/Virtual Keyboard icon in the taskbar.
2. Select "Keyboard" from the menu.
3. Tap the data entry area on the display when you want to enter data using the Input Panel.

Using the Stylus

Note: This section is directed to the MX7 daily user. The assumption is that the mobile device has been configured and the touch panel calibrated by the System Administrator prior to releasing the MX7 for daily use. The touchscreen should be calibrated before initial use.

The stylus performs the same function as the mouse that is used to point to and click elements on a desktop computer. The stylus is used in the same manner as a mouse – single tap or double tap to select menu options, drag the stylus across text to select, hold the stylus down to activate slider bars, etcetera.

Hold the stylus as if it were a pen or pencil. Touch an element on the screen with the tip of the stylus then remove the stylus from the screen. The touchscreen responds to an actuation force (touch) of 4 oz. (or greater) of pressure.

The stylus can be used in conjunction with the keyboard and scanner and an input/output device connected to the serial port.

- Touch the stylus to the field of the data entry form to receive the next data feed.
- The cursor begins to flash in the field.
- The unit is ready to accept data from either the physical keypad, virtual keyboard, or the integrated scanner.

Note: Always use the point of the stylus for tapping or making strokes on the display. Never use an actual pen, pencil, an abrasive or sharp object to write on the touchscreen.

Using the Scanner

Read all cautions, warnings and labels **before** using the laser scanner.

Do not look into the laser's lens.

Do not stare directly into the laser beam.

To scan with the integrated laser barcode reader, point the laser aperture towards a barcode and press the Scan button. You will see a red laser beam strike the barcode.

Figure 1-24 Scan Beam

Align the red beam so that the barcode is centered within the beam. The laser beam must cross the entire barcode. Move the MX7 towards or away from the barcode so that the barcode takes up approximately two-thirds the width of the beam.

Figure 1-25 Scan Status LED

The Scan Status LED (oval shaped LED below keypad) turns red when the laser beam is on. Following a barcode scan and read the Scan Status LED turns green for two seconds and the MX7 beeps or vibrates, indicating a successful scan. If the scan was unsuccessful, the Scan Status LED turns off and a different beep sequence is heard.

The laser engine and Scan Status LED automatically turn off after a successful or unsuccessful read. The scanner is ready to scan again after the Scan key (or trigger on the handle if installed) is released, or after the Scan Status LED turns off following a successful scan.

Voice Data

Data is entered into the MX7 by speaking into the headset's microphone when prompted. Please contact your System Administrator if assistance is needed with the voice software.

Tethered Scanners

Tethered scanners are not supported on the MX7.

Saving Changes to the Registry

The MX7 saves the registry when you:

- Tap the | **Run** | then type **Warmboot**. Tap OK.
- Perform a Suspend / Resume function (by pressing the Pwr key and then pressing it again).
- Install Restart in the Start menu by | Run | then type CTL RESTART=1 and tap the OK button. Tap | Restart.

The registry save process takes 0 – 3 seconds. If nothing has been changed, nothing is saved (e.g. 0 seconds)

The registry is automatically saved every 20 minutes. It is also saved every tenth time the registry settings are changed. Registry settings are changed when control panel applet (e.g. Date/Time) parameters are changed by the user and a warm boot was not performed afterward.

When you tap the | **Run** | then type **Coldboot** and tap the OK button, factory default registry settings are loaded during coldboot. All changes and settings are lost.

Getting Help

All LXE user guides are now available on one CD and they can also be viewed/downloaded from the LXE ServicePass website. Contact your LXE representative to obtain the LXE Manuals CD.

You can also get help from LXE by calling the telephone numbers listed on the LXE Manuals CD, in the file titled "Contacting LXE". This information is also available on the LXE website.

Explanations of terms and acronyms used in this guide are located in the file titled "LXE Technical Glossary" on the LXE Manuals CD and the LXE ServicePass website.

Manuals

MX7 User's Guide - English
MX7 User's Guide - German
MX7 Multi-Charger / Analyzer User's Guide
LXEbook – MX7 User's Guide (download to mobile device)

RFTerm Reference Guide
CE API Programmers Guide
Integrated Scanner Programmers Guide

Accessories

Note: Items with a Green letter R in the second column are ROHS-compliant. Please contact your LXE representative when ordering ROHS-compliant items as the part number may have changed. Items without the letter R may have received ROHS-compliance after this guide was published.

MX7 **Main Battery**, Lithium Ion	**R**	MX7A380BATT
5 Unit Main Battery **Charger** (US power cord), Includes analyzing capabilities	**R**	MX7A385CHGR5US
5 Unit Main Battery **Charger** (no power cord), Includes analyzing capabilities	**R**	MX7A386CHGR5WW
MX7 Passive vehicle **cradle**. Does not support charging or communication. U-Bracket included.	**R**	MX7A007VMCRADLE
RAM **mount kit** for MX7 Vehicle Bracket. This kit does NOT include the Cradle. Attaches to U-Bracket.	**R**	MX7A001RAMBRKT
Replacement MX7 **Hand Strap**	**R**	MX7A401HANDSTRAP
Carry case for MX7 with no handle, includes shoulder strap	**R**	MX7A402CASENHDL
Carry case for MX7 with handle, includes shoulder strap	**R**	MX7A403CASEHDL
MX7 Voice Application **case** with belt	**R**	MX7A404CASEVRNHDL
Holster for MX7 with handle, belt NOT included	**R**	MX7A405HOLSTERHDL
MX7 Padded **handle** with rubber overmold and two finger trigger, includes wrist strap	**R**	MX7A406HANDLE

Holster for MX7 with no handle, belt not included	**R**	MX7A407HOLSTERNHDL
Black rubber protective **boot**	**R**	MX7A488PROTBOOT
Yellow rubber protective **boot**	**R**	MX7A489PROTBOOTYEL
Carry case for MX7 with Gearkeeper retractor	**R**	MX7A408RETRACTORCASE
Non-handle **holster** that fits MX7 with boot	**R**	MX7A409HOLSTERWBOOT
Holster **belt**	**R**	9200L67
MX7 Charge/Comm Interface **Cable**, USB Client for ActiveSync	**R**	MX7A052MULTICBLUSB
MX7 Charge/Comm Interface **Cable**, RS-232 Serial ActiveSync, D9 Female	**R**	MX7A055MULTICBLDA9F
AC/DC **power supply** with US power cord for use with MX7 Charge/Comm cables	**R**	9000A319PSACUS
AC/DC **power supply** without power cord for use with MX7 Charge/Comm cables	**R**	9000A302PSACWW
RS-232 Serial Adapter **cable**, 6in, for use with printers that provide their own source of power.	**R**	MX7A058ADPTCBLPER
MX7 Headset coiled adapter **cable**, includes quick disconnect headset connector. A headset is still required.	**R**	MX7A060ADPTCBLVOICE
MX7 Replacement **Stylus** , 10-pack	**R**	MX7A584STYLUS
Large tethered **stylus** which fit the MX7 carry cases, 5 pack	**R**	9000A507STYLUS
CD with CE 5.0 API's and LXE API's with documentation for custom application development	**R**	MX7A504CE50SDK
Touch screen anti-glare anti-reflective protective **film**, 10 pack	**R**	MX7A584PROTFILM
VoxBrowser™ English & Americas		VOXBROWSER ENG
VoxBrowser™ Rest-of-the-World		VOXBROWSER ROW
Single ear, single headband, **headset** with noise canceling microphone, includes 5 replacement windscreens		HX1A501SNGBHEADSET
Single ear, dual headband, **headset** with noise canceling microphone, includes 5 replacement windscreens		HX1A502DUALBHEADSET
Dual ear, behind the head, **headset** with noise canceling microphone, includes 5 replacement windscreens		HX1A503BTHHEADSET
Replacement foam **block** for 502 dual band headsets, qty 1		HX1A504AHSBLOCKFOAM

Replacement head **yoke** for dual band 502 headset, qty 1		HX1A505DUALYOKE
Replacement head **yoke** for single band 501 headset, qty 1		HX1A506SINGLEYOKE
Replacement **windscreen** for all headset microphones, 10 Pack		HX1A508WINDSCREEN10
Replacement **windscreen** for all headset microphones, 50 Pack		HX1A509WINDSCREEN50
Replacement foam **ear piece cover** for 501 and 502 headsets, 10 pack		HX1A510FOAMEAR10
Replacement foam e**ar piece cover** for 501 and 502 headsets, 50 pack		HX1A511FOAMEAR50

Chapter 2 Physical Description and Layout

Hardware Configuration

System Hardware

The MX7 hardware configuration is shown in the following figure.

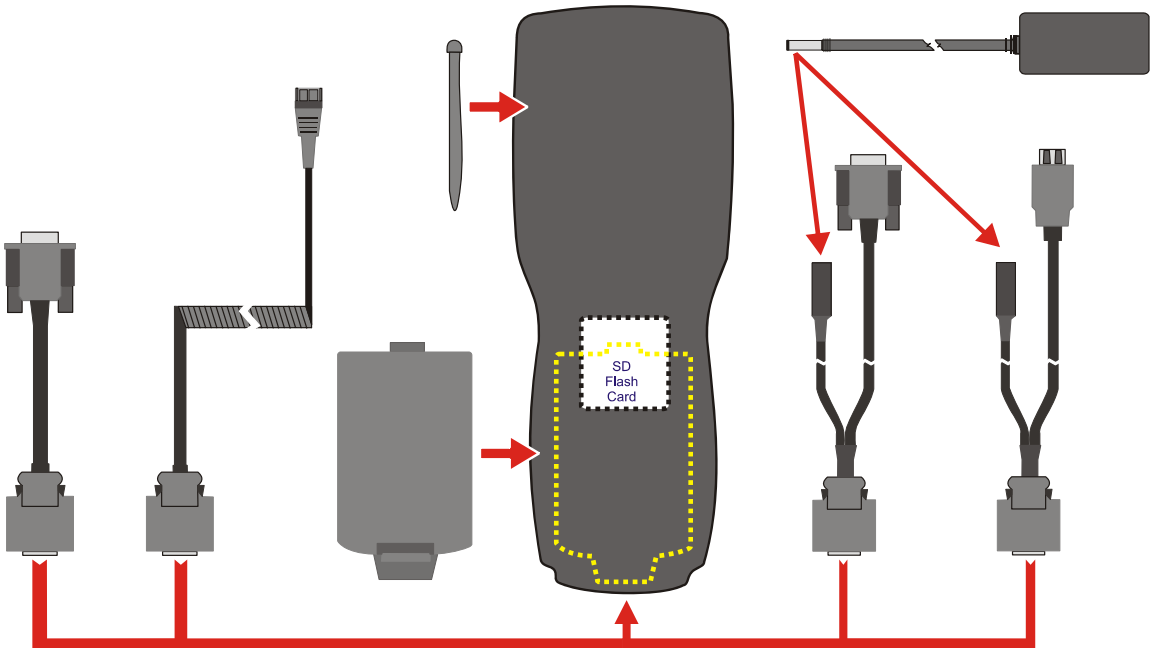


Figure 2-1 System Hardware

Central Processing Unit

The LXE MX7 CPU is a 400MHz Intel Xscale PXA255 CPU. The operating system is Microsoft Windows CE 5.0. The OS image is stored on an internal SD flash card and is loaded into DRAM for execution.

The Xscale turbo mode switching is supported and turned on by default.

Core Logic

The MX7 supports the following I/O components of the core logic:

- One SD card slot under the main battery pack.
- One serial port.
- One Digitizer Input port (Touchscreen).

System Memory

The 400MHz CPU configuration supports 128MB SDRAM, 128MB SD card.

The system optimizes for the amount of SDRAM available. The operating system executes out of RAM.

Internal flash is used for boot loader code and system low-level diagnostics code. Bootloader code is validated at system startup. The UUID required by CE 5.0 is stored in the boot flash. A second copy of the bootloader code is stored on the internal SD Flash drive, so that if a damaged bootloader is detected, it may be re-flashed correctly.

Internal SD Memory Card

The MX7 has one SD card interface for storage of operating system and program code, as well as persistent storage. The SD slot is accessible from the battery compartment and ships with an LXE-qualified 128MB SD Flash card.

The internal SD flash card supports a FAT file system, via a special device driver, and appears to the OS as a folder. This allows the contents to be manipulated via the standard Windows CE interface. Operating system files are hidden on this drive with a terminal unique identifier in the internal flash, to prevent them being accidentally erased by a user. In addition, the registry hive files are stored on this device. At least 32MB of Flash is available for customer use.

Video Subsystem

The touchscreen is a 3.5" (8.9 cm) diagonal viewing area, ¼ VGA 320 by 240 pixel TFT Reflective Active Color LCD. Backlighting is available and can be turned on and off with key sequences. The turn-off timing is configured through the | **Settings | Control Panel | Display | Backlight** icon. The display controller supports Microsoft CE 5.0 graphics modes.

A touchscreen allows mouse functions (tapping on the display or signature capture) using an LXE approved stylus. The touchscreen has an actuation force with finger less than 100 grams.

The color display has an LED backlight and is optimized for indoor use. The display appears black when the mobile device is in suspend mode.

Power Supply

The LXE MX7 uses two batteries for operation.

Main Battery Pack

A replaceable 2200 mAh Lithium-Ion (Li-Ion) battery pack. The battery pack recharges while in the MX7 when the mobile device is connected to the MX7 optional external AC/DC power source. The main battery pack can be removed from the MX7 and inserted in the MX7 Multi-Charger which simultaneously charges up to five battery packs in four hours. The status indicator is illuminated when the backup battery is being charged by the main battery pack. A new main battery pack can be fully charged in 6 hours when it is in an MX7 connected to AC power and 3.5 hours when it is in the MX7 multicharger.

Backup Battery

An internal 50mAh Nickel Cadmium (NiCad) backup battery. The backup battery is recharged directly by the MX7 main battery pack. Recharging maintains the battery near full charge at all times. When the backup battery is fully drained, it may take up to 5 hours to recharge. The capability to discharge the backup battery is provided to allow the user to condition the battery in order to recover full battery capacity. The backup battery must be replaced by qualified service personnel. The battery has a minimum 2 year service life.

Note: An uninterrupted external power source (wall AC adapters) transfers power to the computer's internal charging circuitry which, in turn, recharges the main battery and backup battery. Frequent connection to an external power source, if feasible, is recommended to maintain backup battery charge status as the backup battery cannot be recharged by a dead or missing main battery.

Radio Ports

Three ports are available on the MX7.

802.11b/g

The MX7 supports an LXE 802.11b/g radio. The LXE radio supports diversity with two internal antennas. The CPU board does not allow hot swapping the radio. Adjusting power management on the radio is set to static dynamic control.

WEP, WPA and LEAP are supported.

COM Port

The MX7 has one mini D 20-pin serial port (a multifunction I/O port) that can be configured by the user.

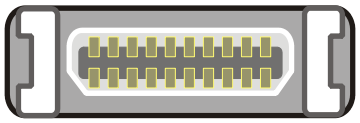


Figure 2-2 COM1 Port

RS-232 Serial Port

Configured as COM1. Bi-directional full duplex and supports data rates up to 115 Kb/s. The port does not have RI or CD signals nor does it support 5V switchable power on pin 9 for tethered scanners. The serial port driver supports full duplex communications over the serial port. It supports data exchange via ActiveSync, but does not automatically start ActiveSync when connected.

The “Cable, Multipurpose RS-232 and Power” and “Adapter, RS-232 terminal port to D9 male” accessories can be used with the RS-232 serial port.

External AC power is available when the multipurpose RS-232/Power cable is connected.

External AC power is not available for the “Adapter, RS-232 terminal port to D9 male” option. Power is drawn from the main battery pack when this adapter is connected..

USB Client Port

The MX7 has one USB Client port for ActiveSync applications. An accessory USB cable, “Cable, Multipurpose USB and Power” is available to connect the MX7 to a USB Type A plug on a PC for ActiveSync functions.

External AC power is available when the multipurpose USB Client/Power cable is connected.

Audio Connection

An audio headset interface is available using the “Adapter, Audio” accessory with the I/O port. The connection cable connects the MX7 to a Voxware quick disconnect 4-pin interface. This cable adapts to specific styles of headsets for voice input, stereo or mono output. The MX7 with a Summit Client supports mono only. A 3-wire connector with (at a minimum) connections for ground, microphone, and 1 speaker. Connecting the headset to the MX7 COM port turns off audio output to the MX7 speaker on the front of the mobile device. All sounds previously directed to the speaker are redirected to the headphone, including beeps. Bias voltage for an electric condenser microphone is available.

External AC power is not available for this option. Power is drawn from the main battery pack.

Audio Support

Speaker

The speaker supplies audible verification signals normally used by the Window's CE operating system. The speaker is located on the front of the MX7, above the MX7 logo. The mobile device emits a Sound Pressure Level (loudness) of at least 102 dB measured as follows:

- Frequency: 2650 ± 100 Hz
- Distance: 10 cm on axis in front of Speaker opening in front of unit.
- Duration : Continuous 2650 Hz tone.

The default is 1 beep for a good scan and 2 beeps for a bad scan.

Volume Control

Volume control is managed by Windows CE control panel applet, an API and the Orange-Scan-up/down arrow key key sequence. Volume control is covered in greater detail later in this guide.

Voice

All Microsoft-supplied audio codecs are included in the OS image. The hardware codecs, the input and output analog voice circuitry and the system design are designed to support voice applications using a headset connected to the "Adapter, Audio" accessory cable and the bottom end connector.

Scanner/Imager Port

The MX7 has one integrated barcode scanner port. Three internal scanner engines and one imager are available. Only one scan engine is installed at a time. Scan engines are not “hot swappable”. The scan engine options are:

- EV-15 linear imager from Intermec
- SE 824 short range scanner from Symbol
- SE 955 high performance scanner from Symbol
- SE 1524ER extended range Lorax scanner from Symbol

The internal scanner activates when the scan button on the front of the MX7 is depressed or when the trigger on an installed trigger handle is depressed. A control panel applet (Start | Settings | Control Panel | Scanner) is available to set scan engine options.

Functionality of the internal scanner driver is based on the driver version installed in the MX7. Functions may include audible tones on good scan (at the maximum db supported by the speaker), failed scan, LED indication of a scan in progress, among other functions. If enabled, a vibration device provides a tactile response on a good scan event.

Configuring specific barcode parameters for any of the scan or imager engines is performed by using the MX7 scanner to scan setup barcodes located in the “Integrated Scanner Programming Guide.”

Note: The SE 955 scanner replaced the SE 824 scanner on all MX7’s manufactured after July 2006.

Physical Controls

Power Key

Note: Refer to the section titled "Power Modes" for information relating to the power states of the MX7.

The power key is located next to the < Z > key on the 55-key keypad and next to the <Diamond 2> key on the 32-key keypad. When a main battery pack is inserted in the MX7 for the first time, the Power key must be pressed.

Quickly tapping the Power key places the MX7 immediately in Suspend mode. Quickly tapping the Power key again, pressing any key, pressing the trigger (on the trigger handle), or tapping the touchscreen, immediately returns the MX7 from Suspend.

The System LED blinks green when the video display is Off.

Note: The unit will suspend on AC power and when connected through ActiveSync. Remember to set the suspend timers before using ActiveSync.

When the Windows CE desktop is displayed or an application begins, the power up (or reboot) sequence is complete. If you have previously saved your settings, they will be restored on reboot. Application and control panel applet changes are saved when OK is tapped on an application applet.

The Process

The MX7 reloads the operating system upon every warm boot or cold boot. Anything not saved or preserved to the registry is lost.

In warm boot, the OS and the CAB files are reloaded from the internal SD card and the preserved registry is also reloaded.

During cold boot, the system behavior is identical to warm boot with the addition that the registry is reloaded with factory defaults.

Warm Reset

Hold down the Power key for 15 seconds until the display blanks, then release the key. A warm reset does not affect the operating system but data in SDRAM is lost. Data saved to the SD card is not lost. Network connection will need to be re-established.

Or, using the input panel, you can tap | **Run** and type WARMBOOT [1]. Tap the OK button.

Cold Reset

Important:-- Because of the extreme nature of the Cold Reset, LXE recommends that the Cold Reset be used only as an emergency procedure and the Warm Reset be used whenever necessary.

Tap | **Run** and type COLDBOOT [1]. Tap the OK button to coldboot the MX7. The default settings are restored when the device powers on again. Calibrating the touchscreen will need to be performed when the cold boot process is complete.

[1] This command filename is not case-sensitive.

Flash Cards

Note: When removing or installing SD cards, protect the MX7 internal components from electrostatic discharge.

Make sure the proper software is pre-loaded and radio cards are properly configured.

The SD flash card under the main battery pack is intended to store program CAB files, MX7 utilities, the registry and the registry backup information.

The internal SD flash card supports a FAT file system, via a special device driver, and appears to the OS as a folder. This allows the contents to be manipulated via the standard Windows CE interface. Operating system files are hidden on this drive with a terminal unique identifier in the internal flash, to prevent them being accidentally erased by a user. In addition, the registry hive files will be stored on this device.

Figure 2-3 Flash Card Location

Note: As there is no card management software loaded on the MX7, LXE recommends purchasing preformatted Flash cards from LXE as the cards have been tested and qualified for use by the MX7 (see "Accessories"). LXE does not support other types of Flash cards at this time. Contact your LXE representative for the latest information about the availability of LXE qualified flash cards for the MX7.

The MX7 has one internal SD Flash card port.

The radio drivers are stored on the card in the SD slot (under the main battery pack). During the boot process, the bootloader loads the operating system, the radio driver and any saved parameters.

Flash Card Installation / Removal

Equipment required: None

- LXE recommends that installation/removal of cards be performed on a clean, well-lit surface.
- Anti-static protection is required when installing/removing cards. (Not supplied by LXE)
- If you anticipate keeping a card out of the MX7 for a long period of time place it in a static-free storage container. Store in an area that is protected from dirt, moisture, and electrostatic contact.

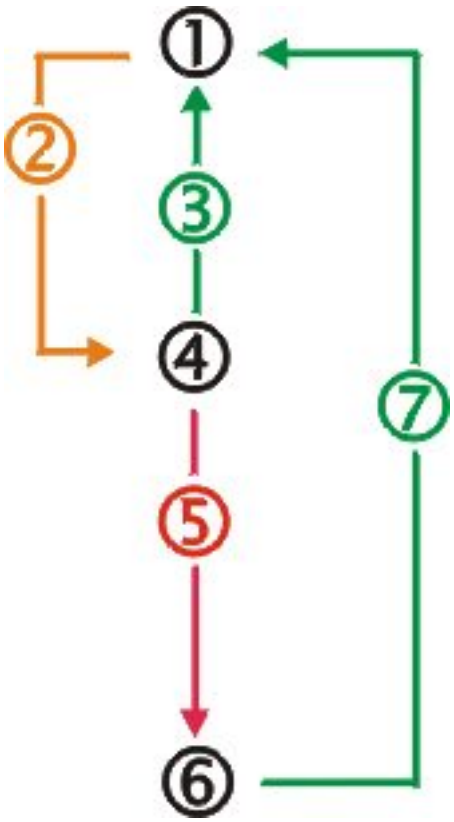
Installation

1. Place the MX7 into Suspend Mode. Disconnect the AC adapter from the MX7.
2. Loosen then remove the main battery pack.
3. Lift the rubber barrier and hold it aside. Do not remove it from the battery well.
4. Slide the flash card into the recessed slot, label side uppermost, until it clicks into place.
5. Replace the rubber barrier and the main battery pack and perform a warm reset. *Always perform a warm reset when exchanging one Flash card for another.*

Removal

1. Place the MX7 into Suspend Mode. Disconnect the AC adapter from the MX7.
2. Loosen then remove the main battery pack.
3. Lift the rubber barrier and hold it aside. Do not remove it from the battery well.
4. Carefully slide the flash card out and away from the recessed slot.

Power Modes



1. **On**
2. Tap Power key or Suspend timer has timed out
3. Power key, any key, trigger press, or touchscreen tap
4. **Suspend**
5. Backup battery and main battery depleted
6. **Off**
7. Power Restored and On key pressed

Figure 2-4 Power Modes – On, Suspend and Off

On Mode

The Display

When the display is On:

- the keyboard, touchscreen and all peripherals function normally
- the display backlight is on until the Backlight timer expires

The MX7

After a new MX7 has been received, a charged main battery inserted, and the Power key tapped, the MX7 is always On until both batteries are drained completely of power.

When the main battery and backup battery are drained completely, the unit is in the Off mode. The unit transitions from the Off mode to the On mode when a charged main battery is inserted or external power is applied and the Power key is pressed.

Suspend Mode

The MX7

The Suspend mode is entered when the unit is inactive for a predetermined period of time or the user taps the Power key.

MX7 Suspend timers are set using | **Settings | Control Panel | Power | Schemes tab**.

A Power key tap wakes the unit and resets the display backlight timers. Any key press, a trigger press, or a touchscreen tap will also wake the unit and reset the display backlight timers.

Connecting the MX7 to AC power wakes the unit and resets the display backlight timers.

When the unit wakes up, the Display Backlight and the Power Off timers begin the countdown again. When any one of the above events occurs prior to the Power Off timer expiring, the timer starts the countdown again.

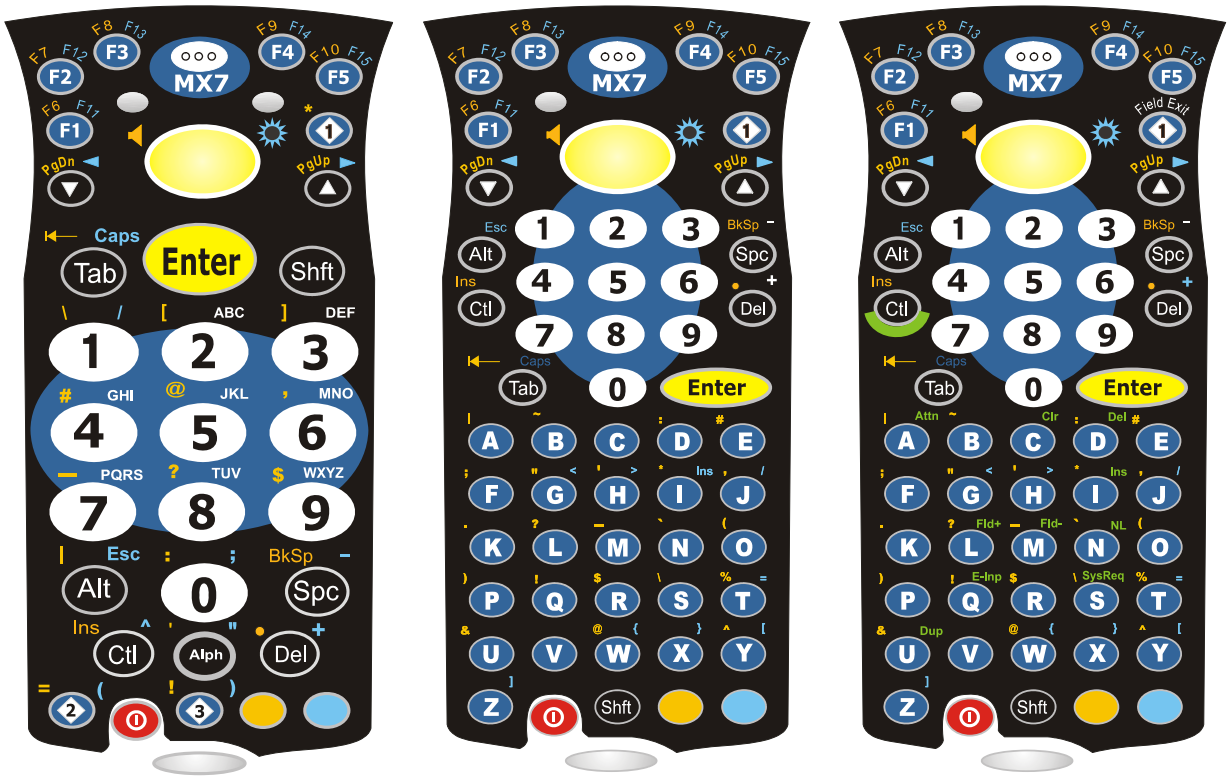
The MX7 should be placed in Suspend mode before hotswapping the main battery.

Off Mode

The unit is in Off Mode when the main battery and the backup battery are depleted. Insert a fully charged main battery and press the Power key to turn the MX7 On.

The Keypads

The keypad is installed and configured by LXE to your specifications.

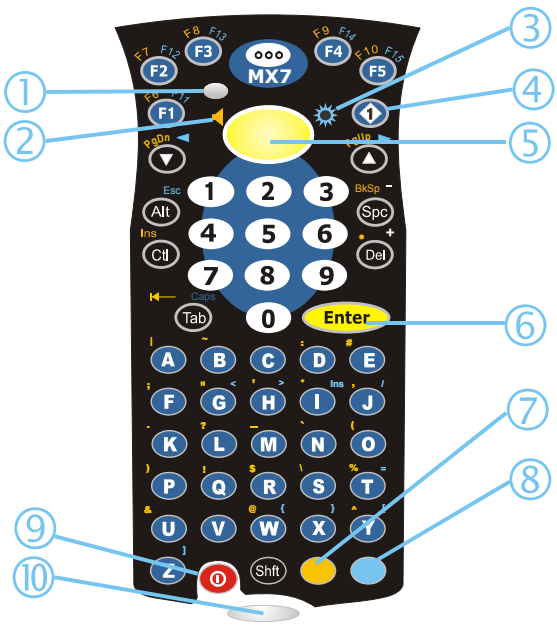


32-key Keypad 55-key ANSI/CE Keypad 55-key IBM 5250 Keypad

Figure 2-5 The 32-key and 55-key Keypads

See also: Appendix A “Key Maps”.

Using the 55 Key ANSI / CE Keypad



1 System Status LED

2 Audio Adjust Icon

3 Display Brightness Icon

4 Diamond Key

5 Scan Button

6 Enter Key

7 Orange Key (Sticky Key)

8 Blue Key (Sticky Key)

9 On Off Button

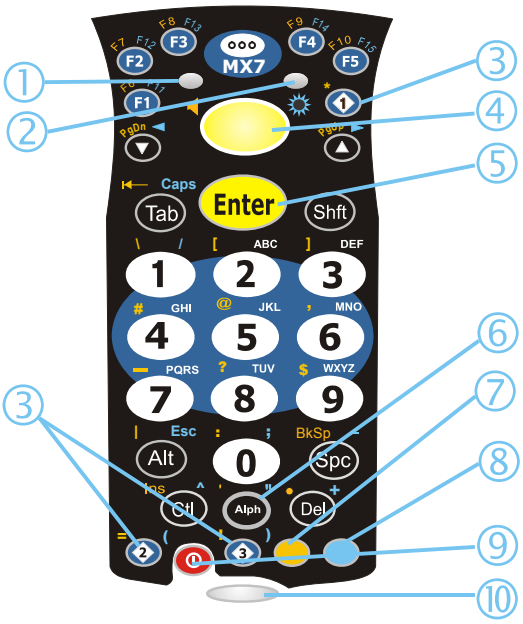
10 Scan Status LED

Figure 2-6 The ANSI / Batch Keypad

- When using a sequence of keys that includes a sticky key, press the sticky key first, release it, then press the rest of the key sequence.
- When using a sequence of keys that includes the Orange or Blue keys, press the color key first then the rest of the key sequence.
- Alphabetic keys default to lower case letters. Press the Shft key, then the alphabetic key for an uppercase letter.
- When the computer boots, the default condition of Caps (or CapsLock) is Off. The Caps (or CapsLock) condition can be toggled with Blue plus Tab key sequence.

The keymaps (keypress sequences) are located in “Appendix A – Key Maps.”

Using the 32-Key Numeric-Alpha Keypad



1 System Status LED

2 Alpha Status LED

3 Diamond Keys

4 Scan Button

5 Enter Key

6 Alph Key

7 Orange Key (Sticky Key)

8 Blue Key (Sticky Key

9 On Off Button

10 Scan Status LED

Figure 2-7 The 32-Key Keypad

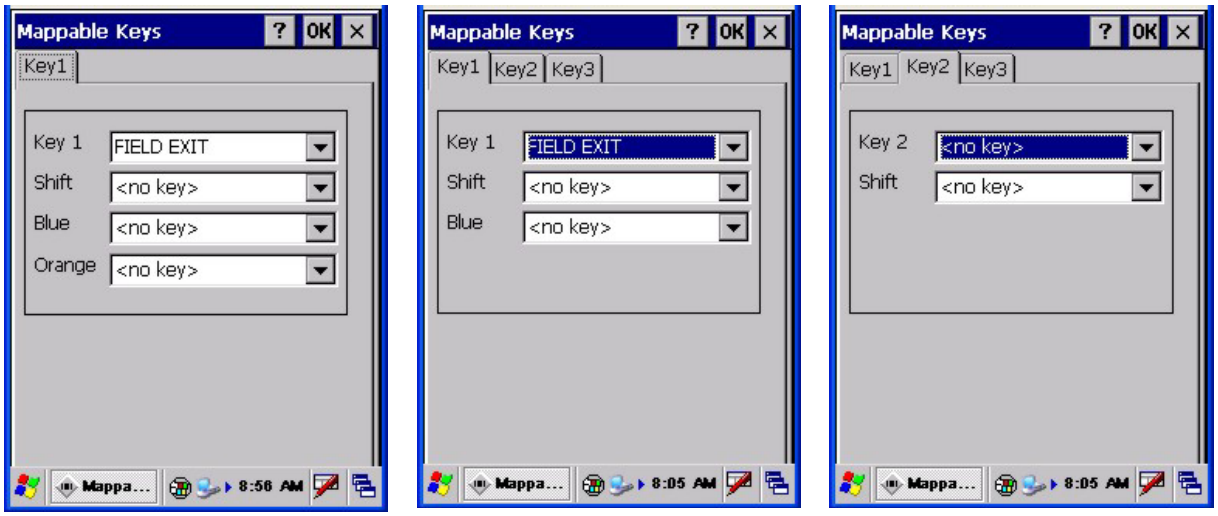
- When using a sequence of keys that require an alpha key, first press the Alph key. Use the Shft sticky key or the Caps key sequence (Blue+Tab) for upper case alphabetic characters.
- Pressing the Alph key forces “Alpha” mode for the 2,3,4,5,6,7,8, and 9 keys. The 1 and 0 keys continue to place a 1 and 0 into the text field.
- To create a combination of numbers and letters before pressing Enter, remember to tap the Alph key to toggle between Alpha and Numeric mode.
- When using a sequence of keys that do not include the Alph key but does include a sticky key, press the sticky key first then the rest of the key sequence.

The keymaps (keypress sequences) are located in “Appendix A – Key Maps.”

Mappable Diamond Keys

The Diamond keys can be programmed to perform specific functions.

For example, using this Settings applet, you could set the Diamond 1 key to function as an ESC key enabling you to use one keypress instead of two when you wanted to use the ESC function. Setting the Diamond 1 key to function as an ESC key does not disable the function of the "standard" ESC key sequence (Blue+Alt).



55 Key Diamond 1 | 32 Key Diamond 1 | 32 Key Diamond 2 / Diamond 3

Figure 2-8 Mappable Diamond Keys

The Diamond 1 key always defaults to Field Exit on all keypads. The Diamond 1 key defaults to Field Exit on both keypads. All other Diamond keys and Diamond Sticky keys have no assigned default value (i.e. their default value is <no key>).

To edit the diamond key parameters, Tap | **Settings** | **Control Panel** | **Mappable Keys** tab. Change the parameter values using the drop down list and tap OK to save the changes. The change takes effect immediately.

See Also: Appendix A "Key Maps".

These keys can be mapped by the user to generate any key code defined by Windows CE with the exception of Shift, Alt, Ctrl, Left/Right Shift, Alt, Ctrl.

55 Key Keypad

The user can program the following key combinations using the Diamond 1 key:

1	Shft + 1	+ 1	+ 1
e.g. ESC (Blue+Alt)	e.g. Home (Shft+Down Arrow)	e.g. BackTab (Orange+Tab)	e.g. Insert (Blue+I)

Any combination of "standard" keypresses can be used.

32 Key Keypad

The user can program the following key combinations using the Diamond keys:

user defined without using a sticky key		asterisk (*)	
user defined without using a sticky key		equal sign (=)	open parenthesis (
user defined without using a sticky key		exclamation mark (!)	closed parenthesis)

LED Indicators

See “Appendix A – Key Maps” for instruction on the specific keypresses to access all keypad functions.

System Status

The System Status LED is located at the top left of the keypad, above the Scan button.

When the LED is . . .	The Status is . . .	Comment
Blinking Red	Power Fail	Replace the main battery with a fully charged main battery. Or Connect MX7 to external AC power then replace the main battery with a fully charged main battery.
Steady Red	Main Battery Low	Replace the main battery with a fully charged main battery.
Blinking Green	Display Off	No user intervention required.
No Color	Good	No user intervention required.

Scan Status

The Scan Status LED is located below the MX7 keypad.

When the Scan Status LED is . . .	The Status is . . .
Steady Green	Good Scan
Steady Red	Scan in Progress
No Color	Scanner/Imager ready for use.

Alpha Mode (32-key Alph Key)

The Alpha Mode LED is located below the <F4> key on the 32-key keypad.

LED functions outlined in previous sections titled “System Status LED” and “Scanner LED” are the same for the 32-key mobile device.

When the Alph LED is . . .	The Status is . . .
Steady Green	Device is in “Alpha” character input mode.
No Color	Device is in “Numeric” key input mode.

Standard Keys

See: Appendix A “Key Maps”.

Scan	The integrated scanner scans only when the Scan button is pressed (or when the scan trigger is pressed on the optional trigger handle).
Enter	The Enter key is used to confirm a forms entry or to transmit information. How it is used is determined by the application running on the mobile device.
Diamond	The Diamond key(s) can be programmed to duplicate a single keypress (as defined by Windows CE) with the exception of the Shift, Alt and Ctrl/Ctl keys.
Numeric	The number keys are used to add numbers to data entry fields.
Alpha	The alpha keys are used to add letters and characters to data entry fields.
Space	The Spc key adds a space to the line of data on the display. This function is similar to a regular keyboard’s Spacebar. Note that the Spc key only stays active for one keystroke.

Function Keys

Sticky Keys

The Sticky Key feature allows the user to activate multi-keypress combinations with one finger.

Ctl / Ctrl (Control key)

A Control sticky keypress stays active until the Control key is pressed again. The Control key enables the control functions of the keypad. This function is similar to a regular keyboard’s Control key. Each time you need to use a Control function, you need to press the Ctl / Ctrl key before pressing the desired key.

Alt (Alternate key)

An Alt sticky keypress stays active until the Alt key is pressed again. The Alt key enables the alternate functions of the keypad. This function is similar to a regular keyboard’s Alt key. Each time you need to use an alternate function, you need to press the Alt key before pressing the desired key.

Shft (Shift key)

A Shift keypress ends a sticky key function. The Shft key enables the shifted functions of the keypad. This function is similar to a regular keyboard’s Shift key. Note that the Shift key only stays active for one keystroke. Each time you need to use a Shifted function, you need to press the Shft key before pressing the desired key.

When the Shft key is pressed the next key is determined by the major key legends, i.e., the alpha keys display lower case letters – when CAPS is On alpha characters are capitalized. For example, when CAPS is On and the Shft key and the G key are pressed, a lower case g is displayed.

Orange and Blue Keys

The Orange and Blue keys are sticky keys that, when tapped, activate the second functions of the keypad. Printed above many keys are small characters, in either orange (on the left side of the key) or blue (on the right side of the key), that represent the second function of that key. Using the sticky key activates the second key function.

Note that the blue and orange sticky keys only stay active for one keystroke. Each time you need to activate a second function you must press the Orange or Blue key. To cancel a sticky key function before pressing another key, press the same sticky key again.

Orange Key

Tap the Orange key to enter "orange" mode. Tap it again to cancel "orange" mode.

If you were in "blue" mode before you pressed the Orange key, blue mode is cancelled and you enter Orange mode.

Blue Key

Tap the Blue key to enter "blue" mode. Tap it again to cancel "blue" mode.

If you were in "orange" mode before you pressed the Blue key, orange mode is cancelled and you enter Blue mode.

Field Exit

	IBM 5250 specific keypad only. The Diamond 1 key can be programmed as a Field Exit key. The Field Exit key is used to exit an input field. If the field is an Auto Enter field, the auto transmit function is activated. Refer to the "Mappable Diamond Keys" section for instruction.
	IBM 5250 specific keypad only. A Control sticky keypress stays active until the Control key is pressed again. The Control key enables the control functions of the keypad. This function is similar to a regular keyboard's Control key. Each time you need to use a Control function, you need to press the Ctl key before pressing the desired key. Note the green highlight on the Control key and the 5250 commands highlighted in green on the 5250 keypad overlay.

Mode Key Functions

CapsLock Mode

This function is similar to a regular keyboard's CapsLock key. Note that the CapsLock mode stays active until the CapsLock key sequence is pressed again. Each time you need to use a Caps function, you need to press the Caps key sequence first. To cancel CapsLock mode press the Caps key sequence again.

The CapsLock key sequence is Blue key then the <Tab> key.

55-Key Keypad

- No CapsLock AND No Shift keypress – result is a lowercase letter.
- CapsLock OR Shift – result is an uppercase letter.
- CapsLock AND Shift keypress – result is a lowercase letter.

Visual Cue: A Capital A is displayed in the taskbar when the device is in CapsLock mode or the Caps Key has been pressed and the next key (to be capitalized) has not been pressed.

32-Key Keypad

Example: 2 B or Not 2 B

To put the number 2 in a text entry field:	Tap the <2> key once.
To put a lowercase "b" in a text field:	Tap the <Alph> key, then tap the <2> key twice.
To put an uppercase "B" in a text field:	Tap the <Alph> key, tap the <Shft> key or the <CapsLock> key, then tap the <2> key twice.

To enter a string of letters in a text field, tap the <Alph> key to toggle it On. It remains active until it is tapped again and toggled off.

To enter a string of numbers in a text field, make sure the <Alph> key is toggled off.

Touchscreen

Figure 2-9 Touchscreen

The touchscreen display is an active color LCD unit capable of supporting VGA graphics modes. Display size is 240 x 320 pixels in portrait orientation. The covering is designed to resist stains. The touchscreen allows signature capture and touch input. A pen stylus is included. The touchscreen responds to an actuation force (touch) of 4 oz. of pressure (or greater).

The color display is optimized for indoor lighting. The display is black when the device is in suspend mode or when both batteries have expired and the unit is Off.

Display Backlight Timer

When the Backlight timer expires the display backlight is turned off.

The default value for the battery power timer is 3 seconds. The default value for the external power timer is "never" and the checkbox is blank.

The backlight timer *dims the backlight* on the touchscreen at the end of the specified time. When the display wakes up, the Backlight timer begins the countdown again.

See the section titled "Set the Display Backlight Timer" in Chapter 1 "Introduction", section titled "Quick Start."

Cleaning the Display/Scanner Aperture

If there is a static screen protector installed, remove the screen protector before cleaning the display panel.

Keep fingers and rough or sharp objects away from the scan aperture and display. If the scanner aperture or display become soiled or smudged, clean only with a standard household cleaner such as Windex(R) without vinegar or use Isopropyl Alcohol. Do not use paper towels or harsh-chemical-based cleaning fluids since they may result in damage to the surface. Use a clean, damp, lint-free cloth. Do not scrub optical surfaces. If possible, clean only those areas which are soiled. Lint/particulates can be removed with clean, filtered canned air.

Static screen protectors for the MX7 are available from LXE.

Power Supply

The MX7 computer is designed to work with a Lithium-Ion (Li-ion) battery from LXE. Under normal conditions it should last approximately eight to ten hours before requiring a recharge. The more you use the scanner or the radio transmitter, the shorter the time required between battery recharges.

A suspended MX7 maintains the date and time for a minimum of two days using a main battery that has reached the Low Warning point and a fully charged backup battery. The MX7 retains data, during a main battery hot swap, for at least 5 minutes.

Note: ***New main battery packs must be charged prior to use****. This process takes up to four hours in an LXE Multi-Charger and six hours when the MX7 is connected to external power.*

Checking Battery Status

Tap the | **Settings** | **Control Panel** | **Power** | **Battery** tab. Battery level, power status and charge remaining is displayed. Turbo setting is enabled/disabled using this applet.

Note: Power drain increases substantially in Turbo mode.

MX7 Status LED and the Batteries

When the LED is . . .	The Status is . . .	Comment
Blinking Red	Power Fail	Replace the main battery with a fully charged main battery. Or Connect the MX7 to external AC power then replace the main battery with a fully charged main battery.
Steady Red	Main Battery Low	Low Battery Warning. Replace the main battery with a fully charged main battery.
No Color	Good	No user intervention required.

Main Battery Pack

The main battery pack has a rugged plastic enclosure that is designed to withstand the ordinary rigors of an industrial environment. Exercise care when transporting the battery pack making sure it does not come in contact with excessive heat or any power source other than the LXE Multi-Charger or the MX7 unit.

When the main battery pack is properly installed in the unit it provides up to eight hours of operation depending upon use and accessories installed. The battery pack is resistant to impact damage and falls of up to four feet to a concrete surface.

Under normal conditions it should last approximately eight hours before requiring a recharge. The more you use the scanner or the radio transmitter, the shorter the time required between battery recharges.

Battery Hotswapping

Important: When the backup battery power is Low or Very Low (| **Settings | Control Panel | Power | Battery** tab) connect the AC adapter to the MX7 *before* replacing the main battery pack.

When the main battery power level is low, the MX7 will signal the user with the low battery warning indicator (the Status LED remains a steady red) that continues until the main battery is replaced, the battery completely depletes, or external power is applied to the MX7 using an AC Adapter.

You can replace the main battery by first placing the device in Suspend Mode then removing the discharged main battery and installing a charged main battery within a five minute time limit (or before the backup battery depletes).

When the main battery is removed the device enters Critical Suspend state, the MX7 remains in Suspend mode, the display is turned off and the backup battery continues to power the unit for at least five minutes. Though data is retained, the MX7 cannot be used until a charged main battery pack is installed. After installing the new battery, press the Power key. Full operational recovery from Suspend can take several seconds while the radio (if installed) is reestablishing an RF link.

If the backup battery depletes before a fully charged main battery can be inserted, the MX7 will turn Off.

Low Battery Warning

It is recommended that the main battery pack be removed and replaced when its energy depletes. When the main battery Low Battery Warning appears (the Status LED remains a steady red) perform an orderly shut down, minimizing the operation of any installed devices and insuring any information is saved that should be saved.

Note: Once you receive the main battery Low Battery Warning, you have approximately 5 minutes to perform an orderly shutdown and replace the main battery pack before the device powers off. The Low Battery Warning will transition the mobile device to Suspend before the device powers off.

Backup Battery

The MX7 has a backup battery that is designed to provide limited-duration electrical power in the event of main battery failure. The backup battery is a 50 mAh Nickel Cadmium (NiCd) battery that is factory installed in the unit. The energy needed to maintain the backup battery near full charge at all times comes from the MX7 main battery.

It takes several hours of operation before the backup battery is capable of supporting the operation of the mobile device. The duration of backup battery life is dependent upon operation of the MX7, its features and any operating applications.

The backup battery has a minimum service life of two years. The backup battery is replaced by LXE.

Discharging

The backup battery can be discharged, recharged and conditioned using a CE Control Panel applet. Tap | **Settings | Control Panel | Battery** then tap the Discharge button.

Handling Batteries Safely

- Never dispose of a battery in a fire. This may cause an explosion.
- Do not replace individual cells in a battery pack.
- Do not attempt to pry open the battery pack shell.
- Be careful when handling any battery. If a battery is broken or shows signs of leakage do not attempt to charge it. Dispose of it using proper procedures.

Caution

Nickel-based cells contain a chemical solution which burns skin, eyes, etc. Leakage from cells is the only possible way for such exposure to occur. In this event, rinse the affected area thoroughly with water. If the solution contacts the eyes, get immediate medical attention.

NiCd and Li-Ion batteries are capable of delivering high currents when accidentally shorted. Accidental shorting can occur when contact is made with jewelry, metal surfaces, conductive tools, etc., making the objects very hot. Never place a battery in a pocket or case with keys, coins, or other metal objects.

Battery Maintenance Publication

The LXE publication “Getting the Most from Your Batteries” is available on the LXE Manuals CD and is a single-source guide to battery management. The publication contains information about battery recharging, conditioning, and other pertinent issues.

MX7 Multi-Charger (Optional)

The multi-charger requires an external power source before battery pack charging / analyzing can commence. The battery pack begins to recharge as soon as it is placed in the battery well. There are five Charging wells. The well closest to the overlay can be used to analyze the main battery pack in the well.

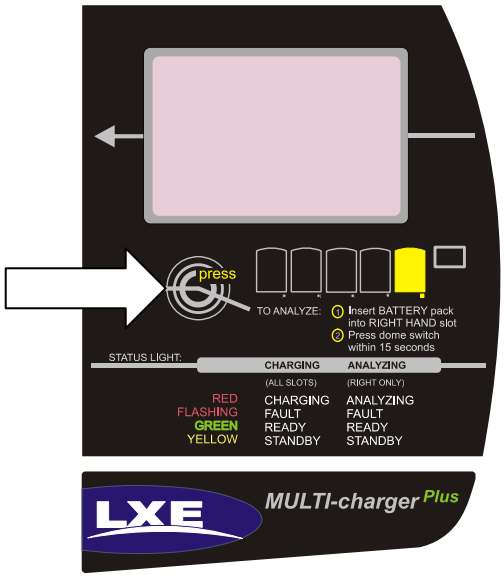


Figure 2-10 LCD Panel and Dome Switch

Pressing the dome switch within three minutes begins the Analyze – Discharge – Charge cycle on the battery pack in the Charge/Analyze well.

The external AC power supply cable connection for the Multi-charger is shipped with the multi-charger.

The main battery pack can be charged in either 1) a powered MX7 Multi-Charger or 2) by a powered AC Adapter connected by multipurpose cables to the mobile device.

Insert the main battery into any charging well in the Multi-Charger. The retaining clip on the battery pack snaps the battery into place in the battery well. Remove the battery pack by depressing the retaining clip and pulling the battery straight up and out.

Do not “slam” or drop the battery into the charging well. Do not allow foreign material to fall or spill into the charging well. Failure to follow these instructions can result in damage to the main battery pack or the Multi-Charger.

Please refer to the “MX7 Multi-Charger User’s Guide” for instruction.

Multi-Charger Indicators

LED Functions

Function	LED Indicator	Description
No Battery/power	Off	Battery pack not plugged in or no power applied.
Charged	Green	Battery pack fully charged.
Charging	Red	Battery pack charging.
Standby	Yellow	Battery pack temperature out of range.
Fault	Flashing Red on any station	Battery pack fault or failure.
Timeout	Flashing Red on any station	Battery analyzer's four hour timeout period expired.
Charger/Analyzer Failure	Flashing Red on all stations.	Battery analyzer fault or failure.

LCD Messages

LCD Indicator	Function	Description
ANALYZE	Analyzing the Battery	Battery pack cycling through Charge, Discharge, Charge.
CHARGE	Charge	Battery pack charging.
DISCHARGE	Discharge	Battery pack discharging.
BAT. FAULT	Battery Fault	Battery pack fault or failure.
READY	Analysis Complete	Battery pack analyzed and ready for use with displayed capacity.
XXXX mAH	Display Capacity	Capacity measured during discharge cycle.
XX VDC	Display volts	Battery volts measured during charge and discharge cycle.

Passive Vehicle Mount Cradle

A passive vehicle mount cradle is available for the MX7. The cradle restrains the MX7. The passive cradle does not have an external device connector e.g. power/RS-232 cable. Wireless client interaction is available as long as the mobile device has sufficient energy in the MX7 main battery pack and a clear signal path.

The cradle is lined with strips of hook-and-loop fabric to ensure a snug fit between the MX7 and the inside of the cradle.

The vehicle cradle should be mounted in an area in the vehicle where it:

- Does not obstruct the driver's vision or safe vehicle operation.
- Will be protected from rain or inclement weather.
- Will be protected from extremely high concentrations of dust or wind-blown debris.
- Can be easily accessed by a user seated in the driver's seat.

There are two mounting options for the cradle:

- U-bracket mounting
- RAM ball cylinder mounting

Before installation begins, verify you have the applicable vehicle mounting bracket assembly components necessary for your mount type, as shown in the section titled "Assembly Components".

Do not slide the MX7 into the passive cradle until the cradle is securely fastened to the vehicle.

Cradle Assembly Components

Note: Bolts, washers, and wrench needed when attaching the mobile device to the vehicle are not supplied by LXE.

U-Bracket

Figure 2-11 Passive Vehicle Mount Cradle and U-Bracket

U-Bracket Footprint

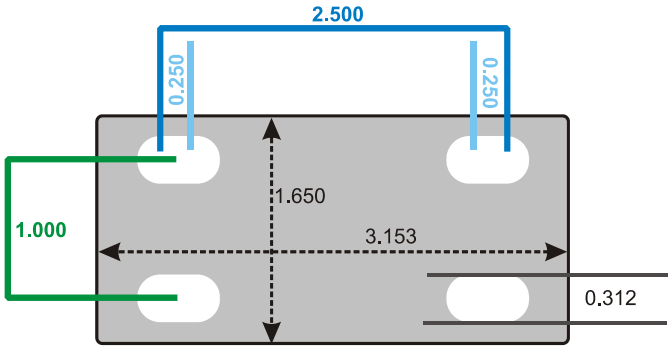


Figure 2-12 U-Bracket Mounting Footprint

Note: LXE does not supply the bolts or washers needed when mounting the cradle assembly to the vehicle chassis. LXE recommends using bolts with a maximum 10/32" (0.3125) diameter.

RAM Ball and Cylinder

Figure 2-13 Passive Vehicle Mount Cradle / RAM Ball Assembly

Figure 2-14 RAM Bracket Components

Mount the cradle U-bracket to the upper RAM ball assembly with the bolts, washers and nuts supplied by LXE.

Qty 4 – Hex Cap ¼-20 x ¾ bolts
Qty 4 – ¼ flat washer
Qty 4 – ¼-20 nylon insert lock nuts

RAM Assembly Footprint

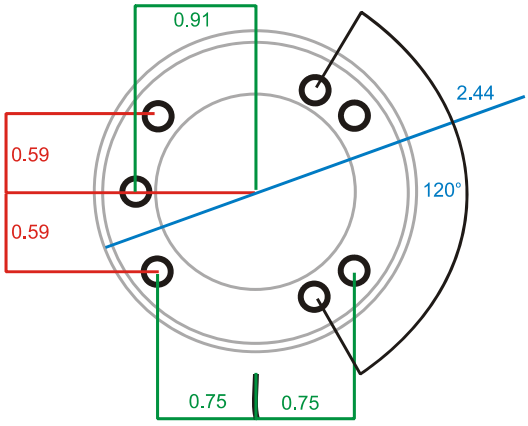


Figure 2-15 RAM Assembly Footprint

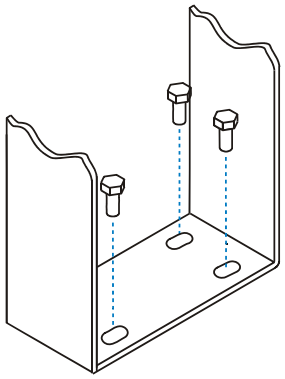
Note: LXE does not supply the bolts or washers needed when mounting the cradle assembly to the vehicle chassis. LXE recommends using bolts with a maximum 10/32" (0.3125) diameter.

How to Install the Cradle U-Bracket

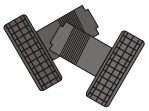
1. MX7
2. Angle Adjust Knob
3. Passive Cradle
4. U-Bracket
5. Mounting Bolt

Figure 2-16 Install Cradle U-Bracket

1. Attach the U-Bracket to the vehicle, making sure it does not impede safe operation of the vehicle.



2. Attach the Passive Cradle to the U-Bracket using the Angle Adjust knobs.

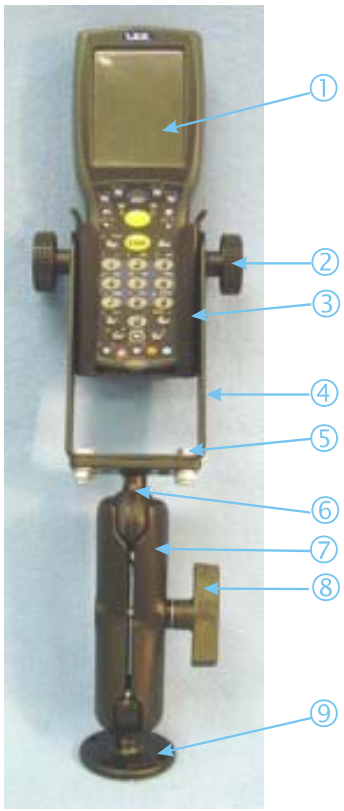


Use both knobs to loosen and tighten the cradle to the U-bracket while determining the best viewing angle.

3. The passive vehicle mounted cradle is ready for use.

Periodically test the mounting device and retighten bolts and/or knob as needed. If the cradle becomes cracked or warped it must be replaced.

How To Install the RAM Bracket



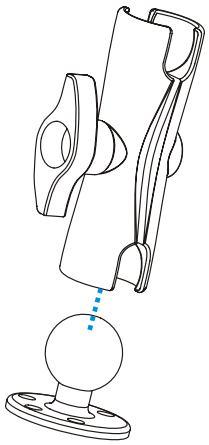
1. MX7
2. Angle Adjust Knobs
3. Passive Cradle
4. U-Bracket
5. Mounting Hex Bolt
6. Upper RAM Ball Assembly
7. Arm
8. Thumbscrew
9. Lower RAM Ball Assembly

Figure 2-17 Install RAM Bracket Assembly

1. Attach the lower RAM ball assembly to the vehicle, making sure it does not impede safe operation of the vehicle.

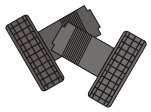
2. Fasten the upper RAM ball assembly to the base of the U-bracket using the supplied bolts, washers and screws.

3. Loosen the turnscrew on the RAM arm, place the lower socket over the vehicle mount RAM ball, then the other arm socket over the RAM ball on the U-bracket.



4. Tighten the arm turnscrew until the U-bracket is secured to the RAM arm and the vehicle.

5. Attach the Passive Cradle to the U-Bracket using the Angle Adjust knobs.



Use both knobs to loosen and tighten the cradle to the U-bracket while determining the best viewing angle.

6. The passive vehicle mounted cradle is ready for use.

Periodically test the mounting device and retighten bolts and/or knob as needed. If the cradle becomes cracked or warped it must be replaced.

Chapter 3 System Configuration

Introduction

There are several different aspects to the setup and configuration of the MX7. Many of the setup and configuration settings are dependent upon the optional features such as hardware and software installed on the mobile device. The examples found in this chapter are to be used *as examples only*, because the configuration of your specific MX7 may vary. The following sections provide a general reference for the configuration of the MX7 and some of its optional features.

Note: LXE recommends frequently charging the MX7 using an external power source to ensure continuous charging of the backup battery.

Windows CE 5.0

For general use instruction, please refer to commercially available Windows CE 5.0 user's guides or the Windows CE on-line Help application installed with the MX7.

This chapter's contents assumes the system administrator is familiar with Microsoft Windows options and capabilities loaded on most standard Windows XP or 2000 desktop computers.

Therefore, the sections that follow describe only those Windows capabilities that are unique to the MX7 and its Windows CE environment.

Note:

The MX7 reloads the operating system upon every warm boot or cold boot. Anything not saved or preserved to the registry is lost.

In *warm boot*, the OS and the CAB files are reloaded from the internal SD card and the preserved registry is also reloaded.

During *cold boot*, the system behavior is identical to warm boot with the addition that the registry is erased, forcing the MX7 to reboot with factory defaults. The registry is recreated when 20 minutes of uptime elapses or upon the first save or suspend function.

Installed Software

Note: Some standard Windows options require an external modem connection. Modems are not available from LXE nor supported by LXE.

When you order an MX7 you receive the software files required by the separate programs needed for operation and radio communication. The files are loaded by LXE and stored in folders in the mobile device.

This section lists the contents of the folders and the general function of the files. Files installed in each MX7 are specific to the intended function of the MX7.

Files installed in LXE mobile devices that are configured for a wireless environment usually contain a radio specific driver – the driver for the radio is specific to the manufacturer of the radio installed in the wireless host environment and are not interchangeable.

Software Load

The software loaded on the MX7 computer consists of Windows CE 5.0 OS, hardware-specific OEM Adaptation Layer, device drivers, Internet Explorer for Windows CE browser and MX7-specific utilities. The software supported by the MX7 is summarized below:

Operating System

- **Full Operating System License:** Includes all operating system components, including Windows CE 5.0 kernel, file system, communications, connectivity (for remote APIs), device drivers, events and messaging, graphics, keyboard and touchscreen input, window management, and common controls.

Radio and Device Drivers

Java Option

- Java executables and browser components are handled by the Java option (when installed).

Terminal Emulation

- RFTerm (VT220, TN5250, TN3270). Runs automatically at the conclusion of each reboot.

LXE API Routines (See “Accessories” for the LXE SDK Kit part number)

Note: Please contact your LXE representative to get access to CAB files as they are released by LXE.

Software Applications

The following applications are included:

- WordPad (was PocketWord in previous versions of Windows CE)
- Pocket Inbox
- Viewer: Word
- Viewer: Excel
- Viewer: PDF
- Viewer: Image
- Scanner Wedge (LXE developed)
- Media Player
- ActiveSync
- Internet Explorer

Note that the Viewer applications allow viewing documents, but not editing them.

Software Backup

Application programs and data that are normally RAM resident are backed up via ActiveSync, as well as being stored on the internal SD card. The operating system is on internal SD card and does not need backup. Registry configuration is backed up to internal SD card automatically using the hive registry setup from CE 5.0. Registry backup occurs on every Suspend, WARMBOOT.EXE, Restart or reboot operation.

Version Control

Version numbers are applied to the boot loader and the OS image independently. The version information stored consists of the LXE build number, plus the date and time of compile (in lieu of a build number). These version numbers are stored in non-volatile storage, where the user cannot inadvertently modify them. A control panel and API is provided so the user can reference the version numbers for support purposes.

The MX7 has a unique 128-bit ID code as required by the CE 5.0 specification. This ID number is generated by the boot loader. This ID code is available in the control panel, and via a Win32 standard API.

In addition, an API is provided to return a standard LXE copyright string, so that applications may reference this to be sure they are running on an LXE mobile device for licensing purposes.

See “Accessories” for the LXE MX7 SDK Kit part number.

Boot Loader

The MX7 supports a proprietary boot loader. It is the responsibility of the boot loader to:

- Initialize all system hardware
- Load code into internal FPGA device(s)
- Load the OS image from SD card to DRAM
- Initiate OS startup
- Handle wakeup from system suspend, loading saved state
- Handle copying a new boot loader from SD card to internal flash

The MX7 reloads the OS every time during warm boot or cold boot. In Warm Boot (i.e., the user executes a Warm Boot) the OS and the CAB files are reloaded from the internal SD card and the preserved registry is also reloaded. Anything else (user data), which was not preserved in the registry, is lost. During Cold Boot (i.e., user executes a Cold Boot utility) the system behavior is identical to Warm Boot with the addition that the registry is reloaded with factory defaults.

The SD card holds user applications and CAB files. The SD card is mapped to the System folder in the Windows CE file system.

JAVA (Option)

Installed by LXE. Files can be accessed by tapping **Start | Programs | JEM-CE**. Doubletap the EVM icon to open the EVM Console. A folder of JAVA examples and Plug-ins is also installed with the JAVA option. LXE does not support all JAVA applications running on the mobile device.

Folders Copied at Startup

The following folders are copied on startup:

System\Desktop	copied to	Windows\Desktop
System\Fonts	copied to	Windows\Fonts
System\Help	copied to	Windows\Help
System\Programs	copied to	Windows\Programs

Copying these folders at startup saves any changes made by the user. For example, saving user-installed fonts and help files and tailoring the desktop and programs menus to meet the user's needs.

This function copies only the directory contents, no sub-folders.

Files in the Startup folder are executed, but only from System\Startup. Windows\Startup is parsed too early in the boot process so it has no effect.

Executables in System\Startup must be the actual executable, not a shortcut, because shortcuts are not parsed by the launch process.

AppLock

The AppLock program is accessed by the user or the AppLock Administrator at bootup or upon completion of a warm boot. Set parameters using the Administration option in the Control Panel.

See Chapter 4 "AppLock" for instruction.

Desktop

For general use instruction, please refer to commercially available CE user's guides or the CE on-line Help application installed with the MX7.

Note: Whenever possible, use the AC power adapter with the MX7 to conserve the main battery and to ensure the backup battery is charged.

The MX7 Desktop appearance is similar to that of a laptop/desktop PC running Windows 2000 or XP. At a minimum, it has the My Device, Internet Explorer, and the Recycle Bin icons that can be tapped with the stylus to access the contents .

At the bottom of the screen is the Start button. Tapping the Start button causes the Start Menu to pop up. It contains the standard Windows menu options: Programs, Favorites, Documents, Settings, Help, and Run.

The Start Menu Shutdown option found on most desktop PC's has been replaced with a single command: "Suspend" because the MX7 is always powered On (when a fully charged main battery and backup battery are present).

Tap the Suspend button to turn the screen off or tap the red Power button to turn the screen off and place the MX7 into Suspend mode. Tap the Power button to "wake" the unit up.

Desktop Icon	Function
My Device	Access files and programs.
Recycle Bin	Storage for files that are to be deleted.
Internet Explorer	Connect to the Internet/intranet (requires radio card and Internet Service Provider – ISP enrollment is not available from LXE).
Radio Config Utility	Used when setting radio power management, antenna diversity and roaming profiles. LXE recommends using the defaults set by the manufacturer.
Odyssey Client	Used for configuring Funk Odyssey client for radio security settings. Note that only one radio client can be used at a time. If Odyssey Client is present, Summit Client is not present.
Summit Client	Used for configuring Summit client for radio security settings. Note that only one radio client can be used at a time. If Summit Client is present, Odyssey Client is not present.
My Documents	Storage for downloaded files / applications.
Start	Access programs, select from the Favorites listing, documents last worked on, change/view settings for the control panel or taskbar, on-line help, run programs or place the unit into Suspend mode.

My Device Folders

Folder	Description	Preserved upon Reboot
Application Data	Data saved by running applications	No
My Documents	Storage for downloaded files / applications	No
Network	Mounted network drive	No
Program Files	Applications	No
System	Internal SD Flash Card	Yes
Temp	Location for temporary files	No
Windows	Operating System in Secure Storage	No

Start Menu Program Options

The following options represent the factory default program installation. Your system may be different based on the software and hardware options purchased.

Access: | **Programs**

Communication	Stores Network communication options
ActiveSync	Begin ActiveSync connection
Connect	Run this command after setting up a connection
Start FTP Server	Begin connection to FTP server
Stop FTP Server	Stop connection with FTP server
Microsoft File Viewers	View downloaded files (see Note)
Excel Viewer	View Excel documents
Image Viewer	View BMP, JPEG and PNG images
PDF Viewer	View Adobe Acrobat documents
Word Viewer	View Word and RTF files
Command Prompt	The command line interface in a separate window
Inbox	Microsoft Outlook mail inbox
Internet Explorer	Access web pages on the world wide internet
Java	Option.
LXE RFTerm	Option. Terminal emulation application. RFTerm automatically opens as soon as a reboot is completed.
Media Player	Music management program
Microsoft WordPad	Opens an ASCII notepad
Odyssey Client	RF client management program
Radio Config Utility	Radio management program. WZC icon in toolbar
Summit Client	RF client management program
Transcriber	Handwriting recognition program using an integrated dictionary
Windows Explorer	File management program

Note: The Microsoft File Viewers cannot display files that have been password protected or encrypted.

- If installed, RFTerm runs automatically at the conclusion of each reboot.
- If installed and enabled, AppLock runs automatically at the conclusion of each reboot.
- The RF client runs automatically during each reboot.
- If installed, with an Odyssey Client, LXE Login Utility runs automatically at the conclusion of each reboot.

Communication

Access: | **Programs** | **Communication**

Note: Some communication menu options require an external modem connection to the MX7. Modems are not available from LXE nor supported by LXE.

ActiveSync

After a relationship (partnership) has been established with the MX7 and a desktop computer, ActiveSync can synchronize using the radio link, serial port, or USB port on the MX7.

Refer to "ActiveSync / Get Connected Process" later in this chapter for more information and instruction.

To initiate synchronization (or radio link) from the mobile device that already has a relationship with the desktop computer, tap | **Programs** | **Communication** | **ActiveSync** to begin the process.

For more information about using ActiveSync on your desktop computer, open ActiveSync, then open ActiveSync Help.

Connect

Connect is used to initiate a hardwired connection to a host and to create the initial partnership for synchronizing over the radio.

The default connect setup is USB direct connect.

After a Connect setup is selected, | **Programs** | **Communication** | **Connect** will start to connect to a host.

See Also: "Cold Boot and Loss of Host Re-connection"

Start / Stop FTP Server

Access: **| Programs | Communication | Start FTP Server *or* Stop FTP Server**

These shortcuts call the Services Manager to start and stop the FTP server. The server defaults to Off (for security) unless it is explicitly turned on from the menu.

Command Prompt

Access: **| Programs | Command Prompt**

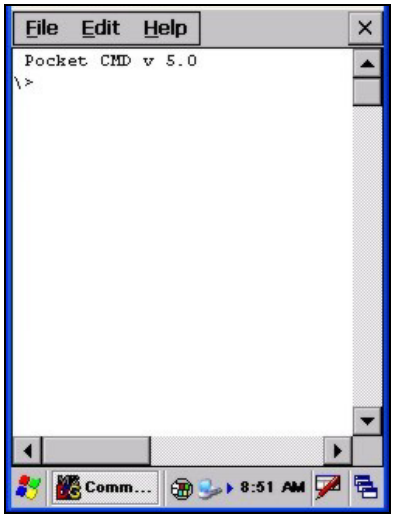


Figure 3-1 Pocket CMD Prompt Screen

Type help at the command prompt for a list of available commands. Exit the Command Prompt by typing exit at the command prompt or select File | Close.

Inbox

Access: | **Programs** | **Inbox**

This option requires a connection to a mail server. There are a few changes in the CE version of Inbox as it relates to the general desktop Windows PC Microsoft Outlook Inbox options. Tap the "?" button to access Inbox Help.

ActiveSync can be used to transfer messages between the MX7 inbox and a PC's desktop inbox. Refer to "ActiveSync Processes" in this guide.

Internet Explorer

Access: | **Programs** | **Internet Explorer**

The default start page is www.lxe.com and the default search page is www.google.com.

See section titled "Internet Options" later in this chapter for Internet Explorer settings.

Internet Explorer requires a radio card and an Internet Service Provider to access the Internet. There are a few changes in the CE version of Internet Explorer as it relates to the general desktop Windows PC Internet Explorer options.

Select View | Options to setup General, Connection, Security, Privacy, Advanced, and Popup options when connecting to the Internet.

Tap the "?" button to access Internet Explorer Help.

Media Player

Access: | **Programs** | **Media Player**

There are few changes in the CE version of Media Player as it relates to the general desktop Windows PC Microsoft Media Player options.

Select View | Options to setup Buffering, Playback and Media Network Share options when connecting to the Internet. This option requires a radio card and an Internet Service Provider.

Tap the "?" button to access Media Player Help.

Microsoft WordPad

Access: | **Programs** | **Microsoft WordPad**

Create and edit documents and templates in WordPad, using buttons and menu commands that are similar to those used in the desktop PC version of Microsoft Word. By default WordPad files are saved as .PWD files. Documents can be saved in other formats e.g. .RTF or .DOC.

Tap the "?" button to access WordPad Help.

Odyssey Client

Access: | Programs | Odyssey Client

Odyssey automatically installs and runs after every cold and warm boot.

Disable Odyssey	**Start	Programs	Odyssey Client	Settings	Disable Odyssey**
When Odyssey is disabled, the Wireless Zero Config screen is displayed. When Odyssey is disabled before Suspend mode, it is *not* re-enabled upon a return from suspend.	
Enable Odyssey	**Start	Programs	Odyssey Client	Settings	Enable Odyssey**
When Odyssey is disabled, selecting Enable Odyssey from the Settings menu *may* not re-enable Odyssey. Odyssey is enabled by default after every cold and warm reset.	

See Chapter 5 “Wireless Network Configuration” for Odyssey client setup information and instruction.

Radio Config Utility

Access: | Programs | Radio Config Utility

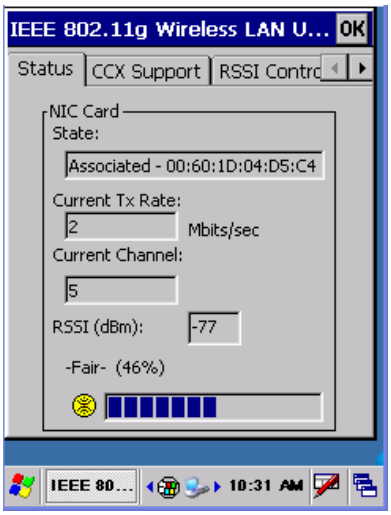


Figure 3-2 Radio Config Utility Main Menu

WiFi icon in Toolbar. Tapping the WiFi icon in the toolbar presents the Radio Config Utility Main Menu to the user. See Chapter 5 “Wireless Network Configuration”, section titled “IEEE 802.11g Wireless LAN Configuration Utility” for WiFi information and instruction.

Wireless Zero Config Utility and the Odyssey Client

This utility has an icon in the toolbar that looks like networked computers with a red X through them, indicating the application is inactive at this time.

Note: LXE recommends using the Funk Odyssey client to configure the Odyssey Client. Wireless Zero Config is not recommended for configuring the radio.

Summit Client

Access: | **Programs** | **Summit**

Summit automatically installs and runs after every cold and warm boot.

Disable Summit	**Start**	**Programs**	**Summit**	**SCU**
Tap the Disable Radio button. The radio is enabled by default after every cold reset.	
Enable Summit	**Start**	**Programs**	**Summit**	**SCU**	**Enable Radio**
When the radio is disabled, tap the Enable Radio button. The radio is enabled by default after every cold reset.	

See Chapter 5 “Wireless Network Configuration” for Summit Client Utility setup information and instruction.

Certs

Access: | **Programs** | **Summit** | **Certs**

Contents of README.TXT file located in Start | Programs | Summit | Certs menu option:

> CA Certificate files, user certificate files and PAC files are accessed only from this location. When entering the certificate filenames in the Summit Client Utility (SCU), only the filename and extension are entered. Only PEM, DER and PFX extensions are allowed for certificate files.

See Chapter 5 “Wireless Network Configuration” for directions for acquiring CA and user certificate files.

Wireless Zero Config Utility and the Summit Client

This utility has an icon in the toolbar that looks like networked computers with a red X through them, indicating the application is enabled and the MX7 is not connected to a network.

If you will be using the Wireless Zero Config Utility to configure the radio, or connect to a network, perform the following steps:

1. Tap the Summit Client Utility icon on the desktop, or tap **Start** | **Programs** | **Summit** | **SCU**.
2. Select **ThirdPartyConfig** in the Active Config drop down box.
3. A message appears that a Power Cycle is required to make settings activate properly. Tap **OK** to close the message window.
4. Tap the **Power** button to place the MX7 in **Suspend**, then tap the Power button to **wake the MX7** from Suspend mode.

The Wireless Zero Config utility begins.

Transcriber

Access: | **Programs** | **Transcriber**

Select Transcriber on the **Start** | **Programs** menu or tap the icon on the Desktop. To make changes to the Transcriber application, enable or disable the current Transcriber session, etc., tap the “hand with a pen” icon in the toolbar. When the “hand with a pen” is active, all touchscreen activity is captured/read by the transcriber program.

Tap the “?” button or the Help button to access Transcriber Help.

Windows Explorer

Access: | **Programs** | **Windows Explorer**

There are a few changes in the CE version of Windows Explorer as it relates to the general desktop PC Windows Explorer options. Tap the “?” button to access Windows Explorer Help.

Taskbar

Access: | Settings | Taskbar ...

The Taskbar can be used to determine how the taskbar appears on the display. Use the Advanced tab to clear the contents of the Documents menu.

Factory Default Settings	
General	
Always on Top	Enabled
Auto hide	Disabled
Show Clock	Enabled
Advanced	
Expand Control Panel	Disabled

There are a few changes in the CE version of Taskbar as it relates to the general desktop PC Windows Taskbar options.

When the taskbar is auto hidden, press the **Ctrl** key then the **Esc** key sequence (Blue+Alt) to make the Start button appear.

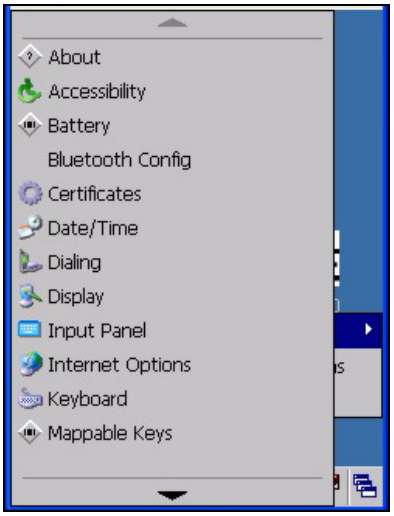
Figure 3-3 Taskbar General Tab

Advanced Tab

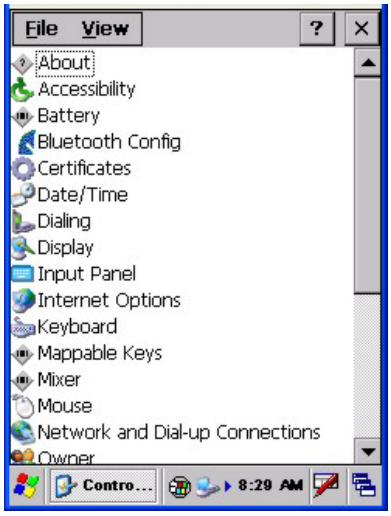
Expand Control Panel

Tap the checkbox to have the Control Panel folders appear in drop down menu format from the **Settings | Control Panel** menu option. When it is unchecked, the Control Panel Properties screen is displayed.

Figure 3-4 Advanced Tab



The Result of "Expand Control Panel" checkbox enabled



One Result of "Expand Control Panel" checkbox disabled

Clear Contents of Document Folder

Tap the Clear button to remove the contents of the "Recently Opened" Document folder.

Settings | Control Panel Options

Access: | **Settings | Control Panel** or **My Device | Control Panel link**

Getting Help

Please tap the "?" box to get Help when changing Settings options.

Option	Function
About	Software, hardware, versions and network IP. No user intervention allowed.
Accessibility	Customize the way the keyboard, audio, display or mouse functions.
Administration	LXE AppLock Administration utility. See Chapter 4 for details.
Battery	View voltage and status of the main and backup batteries. Battery charge and discharge is performed using this option.
Certificates	Manage digital certificates used for secure communication.
Date/Time	Set Date, Time, Time Zone, and Daylight Savings.
Dialing	Set dialup properties for internal modems (not supplied/supported by LXE).
Display	Set background graphic and scheme. Set backlight properties and timers.
Input Panel	Select the current key / data input method.
Internet Options	Set General, Connection, Security, Privacy, Advanced and Popups options for Internet connectivity.
Keyboard	Select a Key Map (or font). Set key repeat delay and key repeat rate.
Mappable Keys	Assign key presses to Diamond keys.
Mixer	Adjust the input and output parameters – volume, sidetone, and record gain, for headphone, software and microphone.
Mouse	Set the double-tap sensitivity for stylus taps on the touchscreen.
Network and Dial Up Options	Set network driver properties and network access properties.
Owner	Set the mobile device owner details (name, phone, etc). Enter notes. Enable / disable Owner display parameters. Enter Network ID for the device – user name, password, domain.
Password	Set MX7 access password properties for signon and/or screen saver.

Option	Function
PC Connection	Control the connection between the MX7 and a local desktop or laptop computer.
Power	Set Power scheme properties. Review device status and properties..
Regional Settings	Set appearance of numbers, currency, time and date based on country region and language settings.
Remove Programs	Remove user installed programs in their entirety. *Note: Programs listed in this location are deleted upon warm and cold boot processes.*
Scanner	Set scanner key wedge, internal scanner port, and good scan vibration options. Assign baud rate, parity, stop bits and data bits for COM1 port.
Stylus	Set double-tap sensitivity properties and/or calibrate the touch panel.
System	Review System and Computer data and revision levels. Adjust Storage and Program memory settings. Enter device name and description. Review copyright notices.
Terminal Server Client Licenses	Select a server client license from a drop down list. *(Not available at this release)*
Volume and Sounds	Enable / disable volume and sounds. Set volume parameters and assign sound wav files to CE events.

Note: Change the font displayed on the screen by choosing | Settings | Control Panel | Keyboard and then the Key map dropdown list.

About

Access: | **Settings | Control Panel | About**

Displays hardware and software details.

Tab Title	Contents
Software	GUID, Windows CE Version, OAL Version, Bootloader Version, Compile Version, FPGA Version and Language. Language indicates any pre-installed Asian fonts.
Hardware	CPU Type, Codec Type, FPGA Version, Scanner type, Display, Flash memory, and DRAM memory
Versions	LXE Utilities, LXE Drivers, LXE Image, LXE API, Internet Explorer, and .NET Framework Version.
Network IP	Current network connection IP and MAC address.

User application version information can be shown in the Version window. Version window information is retrieved from the registry.

Modify the Registry using the Registry Editor (see section titled “Utilities”). LXE recommends **caution** when editing the Registry and also recommends making a backup copy of the registry before changes are made.

The registry settings for the Version window are under HKEY_LOCAL_MACHINE \ Software \ LXE \ Version in the registry.

Create a new string value under this key. The string name should be the Application name to appear in the Version window. The data for the value should be the version number to appear in the Version window.

Accessibility

Access: | Settings | Control Panel | Accessibility

Customize the way the keyboard, sound, display, mouse, automatic reset and notification sounds function. There are a few changes from general desktop Accessibility options. Adjust the settings and tap the OK box to save the changes. The changes take effect immediately.

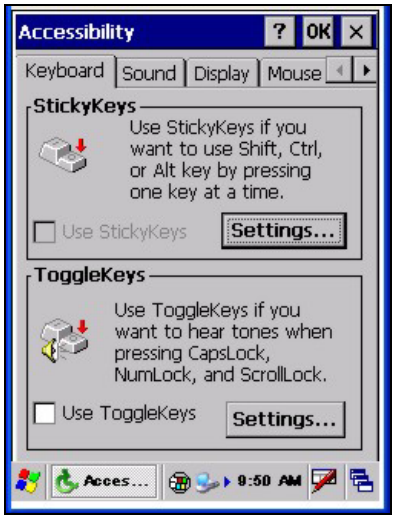


Figure 3-5 System – Accessibility

The following exceptions are due to a limitation in the Microsoft Windows CE operating system:

- If the ToggleKeys option is selected, please note that the ScrollLock key does not produce a sound as the CapsLock and NumLock keys do.
- If the SoundSentry option is selection, please note that ScrollLock does not produce a visual warning as the CapsLock and NumLock keys do.

Administration – For AppLock

Access: | Settings | Control Panel | Administration

Use this option to set parameters for computers intended to be used as dedicated, single or multiple application devices. In other words, only the application or feature specified in the AppLock configuration by the Administrator are available to the end-user.

LXE devices with the AppLock feature are shipped to start up in Administration mode with no default password, and when the device is started for the first time, the user has full access to the mobile device and no password prompt is displayed. After the Administrator specifies an application or applications to lock, assigns a password and the device is rebooted (or the hotkey is pressed), the mobile device is then in end-user mode.

AppLock also contains a component which sets configuration parameters as specified by the Administrator.

See Chapter 4 “AppLock” for further information and instruction.

Battery

Access: | Settings | Control Panel | Battery

View the status of the Main and Backup batteries.

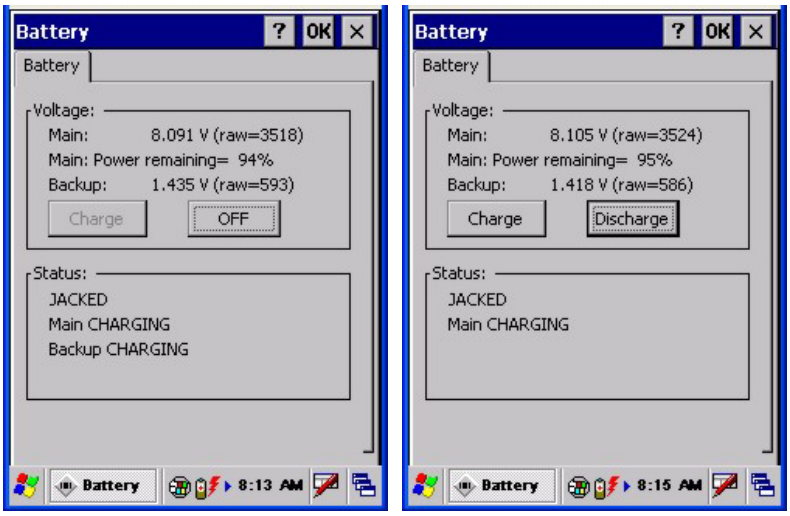


Figure 3-6 System – Battery

The Battery tab shows the status and the percentage of power left in the main battery. It also shows the status of the backup battery. The listed values cannot be changed by the user.

Tap the Charge or Discharge buttons to charge and discharge the backup battery. If the battery is Charging, tap the Power (turn device Off) button to stop the Charge process. Tap Discharge a second time to begin the Discharge process. If the battery is Discharging, tap the Charge button to stop the Discharge process. Tap Charge a second time to begin the Charge process.

LXE recommends Discharging and Recharging the backup battery twice a year.

Certificates

Access: | **Settings | Control Panel | Certificates**

Manage digital certificates used for secure communication.

Figure 3-7 System – Stored Certificates

Lists the Stored certificates trusted by the MX7 user. These values may change based on the type of radio security resident in the client, access point or the host system.

Tap the **Import** button to import a digital certificate file.

Tap the **View** button to view a highlighted digital certificate.

Tap the **Remove** button to remove highlighted certificate files.

Tap the "?" button and follow the instructions in the Help file when working with trusted authorities and digital certificates.

See Also: Chapter 5 "Wireless Network Configuration" for instruction.

Date/Time

Access: | **Settings | Control Panel | Date/Time Icon**

Set Date, Time, Time Zone, and assign a Daylight Savings location after a warm boot or a cold boot or at anytime.

Factory Default Settings	
Current Time	Midnight
Time Zone	GMT-05:00
Daylight Savings	Enabled

Figure 3-8 Date/Time Properties

There is very little functional change from general desktop PC Date/Time Properties options. Adjust the settings and tap the OK box or the Apply button to save the changes. The changes take effect immediately. Double-tapping the time displayed in the Taskbar causes the Date/Time Properties screen to appear.

Dialing

Access: | Settings | Control Panel | Dialing

Set dialup properties for internal modems (not supplied/supported by LXE).

Factory Default Settings	
Location	Work
Area Code	425
Tone Dialing	Enabled
Country/Region	1
Disable Call Waiting	Disabled

Figure 3-9 Dialing

Tap the Edit button to make changes to Dialing properties. Tap the "?" and follow the instructions in Help.

Display

Access: | Settings | Control Panel | Display Icon

Select the Desktop image and set the display/keypad backlight timers when on battery or external power.

Factory Default Settings	
Background	Windows CE
Tile	Disabled
Appearance	
Default	Windows Standard
Backlight	
Battery Auto Turn Off	Enabled
Idle Timer	3 seconds
External Auto Turn Off	Enabled
Idle Timer	2 minutes

Background

Figure 3-10 Display – Background

There is very little change from general desktop PC Display Properties / Background options. Select an image from the dropdown list (or tap the Browse button to select an image from another folder) to display on the Desktop, then tap the OK box to save the change. The change takes effect immediately.

Appearance

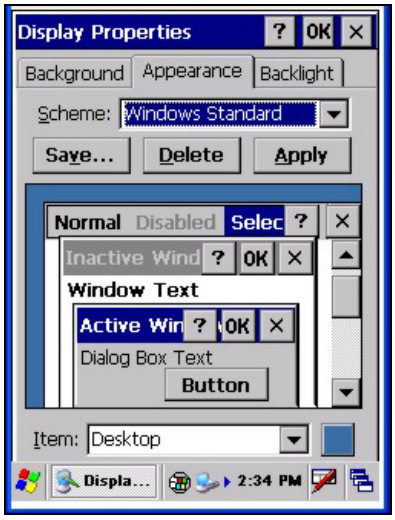


Figure 3-11 Display – Appearance

There is very little change from general desktop PC Appearance options. Select a scheme from the dropdown list and make changes to the parameters. Tap the Save button to save any changes, renaming the scheme if desired. Tap the Delete button to delete schemes. Tap the Apply button to apply the selected scheme to the MX7. Tap the OK box to exit, or "X" to escape without making any changes. Saved changes take effect immediately.

Backlight

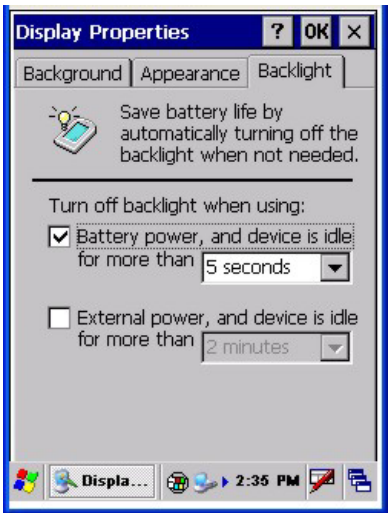


Figure 3-12 Display – Backlight

When the backlight timer expires, the screen backlight is dimmed not turned off. Default values are 3 seconds for Battery and 2 minutes for External.

Adjust the settings and tap the OK box to save the changes or the "X" button to escape without making any changes. Tap the "?" button for Help. The changes take effect immediately.

Input Panel

Access: | Settings | Control Panel | Input Panel

Select the current key / data input method.

Factory Default Settings	
Input Method	Keyboard
Allow applications to change input panel state	Enabled
Options	
Keys	Small keys
Use gestures	Disabled

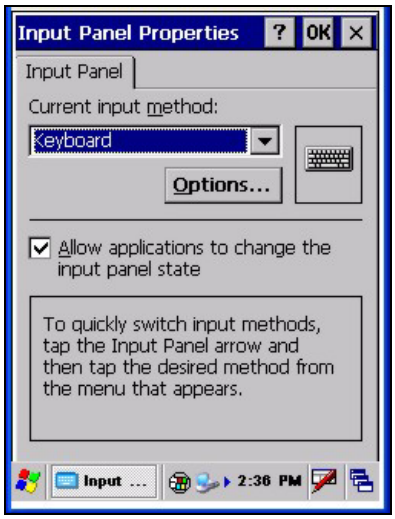

Input Panel Properties
?
OK
Input Panel
Current input method:
Keyboard
Options...
Allow applications to change the input panel state
To quickly switch input methods, tap the Input Panel arrow and then tap the desired method from the menu that appears.
Input ...
2:36 PM

Figure 3-13 Input Panel

Use this screen to make the Input Panel or the physical keypad primarily available when entering data.

Tap the Options button to set the size of the keys displayed on-screen and whether gestures are enabled or disabled.

Tap the "OK" button to save any changes and exit, or tap the "X" button to exit without saving any changes. Tap the "?" button for Help.

Note: Check with your LXE representative for language packs as they become available.

Internet Options

Access: | **Settings | Control Panel | Internet Options**

Set options for internet connectivity.

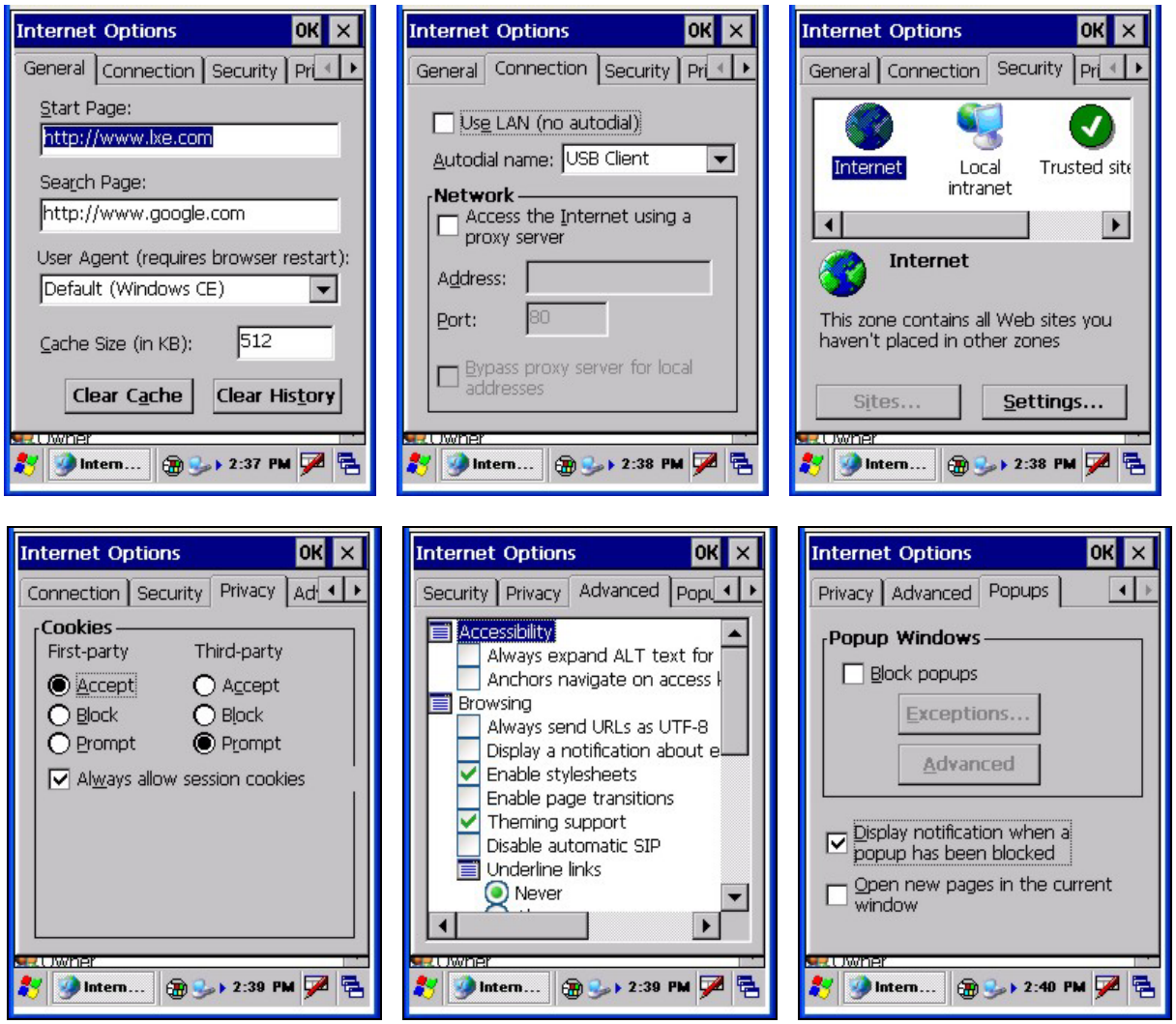


Figure 3-14 Internet Options

Select a tab. Adjust the settings and tap the OK box to save the changes. Changes are saved from tab to tab. Tap the "X" box to ignore all changes. The changes take effect immediately. Tap the "?" button for Help.

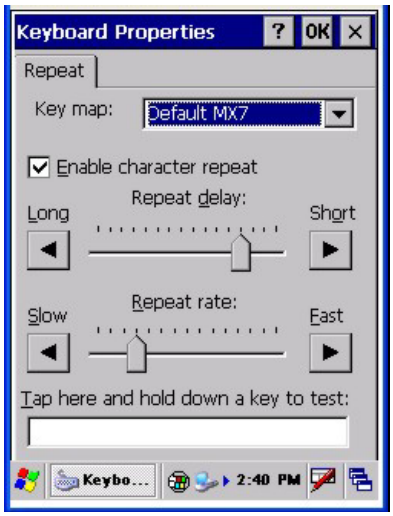
Factory Default Settings	
General	
Start Page	http://www.lxe.com/
Search Page	http://www.google.com
Cache Size	512 Kb
Connection	
Use LAN	Disabled
Autodial Name	Blank

Factory Default Settings	
Proxy Server	Disabled
Bypass Proxy	Disabled
Security	
Allow cookies	Enabled
Allow TLS 1.0 security	Disabled
Allow SSL 2.0 security	Enabled
Allow SSL 3.0 security	Enabled
Warn when switching	Enabled
Privacy	
First party cookies	Accept
Third party cookies	Prompt
Session cookies	Always allow
Advanced	
Stylesheets	Enable
Theming Support	Enable
Multimedia	All options enabled
Security	All options enabled
Popups	
Block popups	Disabled
Display notification	Enabled
Use same window	Disabled

Keyboard

Access: | Settings | Control Panel | Keyboard Icon

Set keypad key map and keypad key repeat delay and key repeat rate.



Factory Default Settings	
Repeat	Enable
Delay	Short
Rate	Slow
Key map	Default

Figure 3-15 Keyboard

Select a key map using the drop-down list. Adjust the character repeat settings and tap the OK box to save the changes. Tap the "X" box to ignore changes. Tap the "?" box for Help. The changes take effect immediately.

When new key maps, or fonts, are added to the registry, they appear in the Key map dropdown list on the Keyboard Properties panel. Only one font at a time can be selected. The fonts affect the screen display.

These values do not affect virtual (onscreen) key taps.

Keymaps and Fonts

Please contact your LXE representative about the availability of these fonts for your MX7:

Descriptive name	Font filename	Notes
Simplified Chinese	simsun.ttc	These Asian fonts are ordered separately and built-in to the MX7 OS image. Built-in fonts are added to registry entries and are available immediately upon startup. Thai, Hebrew, Arabic and Cyrillic Russian fonts are available in the default (extended) fonts. See About | Software | Language for the name of any installed fonts.
Traditional Chinese	mingliu.ttc	
Japanese	msgothic.ttc	
Korean	gulim.ttc	

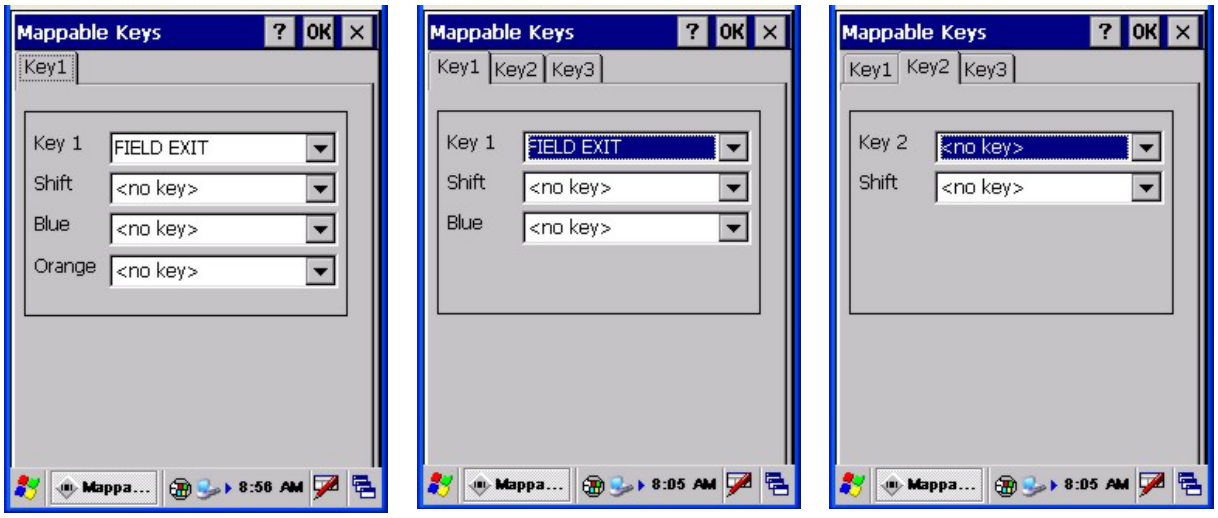
When an Asian font is copied into the fonts folder on the card/System folder; the font works for Asian web pages, the font works with RFTerm, the font does not work for Asian options in Regional Control Panel, the font does not work for naming desktop icons with Asian names, the font does not work for third-party .NET applications, and the font does not work for some third-party MFC applications.

Mappable Keys

Access: | Settings | Control Panel | Mappable Keys Icon

Use this option to assign key sequences to Diamond keys.

Factory Default Settings		
55 Key Keypad		
Diamond 1		
No sticky key	Field Exit	
Shift+Diamond 1	No key	
Orange+Diamond 1	No key	
Blue+Diamond 1	No key	
32 Key Keypad		
Diamond 1		
No sticky key	Field Exit	
Shift+Diamond 1	No key	
Orange+Diamond 1	*	Fixed setting (not mappable)
Blue+Diamond 1	No key	
Diamond 2		
No sticky key	No key	
Shift+Diamond 2	No key	
Orange+Diamond 2	=	Fixed setting (not mappable)
Blue+Diamond 2	(	Fixed setting (not mappable)
Diamond 3		
No sticky key	No key	
Shift+Diamond 3	No key	
Orange+Diamond 3	!	Fixed setting (not mappable)
Blue+Diamond 3	)	Fixed setting (not mappable)



55 Key Diamond 1 32 Key Diamond 1 32 Key Diamond 2 / Diamond 3

Figure 3-16 Mappable Keys

Assign key sequence settings by selecting keys from the drop down boxes. Tap the OK box to save the changes. Tap the "X" box to ignore changes. Tap the "?" box for Help. The changes take effect immediately.

Mixer

Access: | Settings | Control Panel | Mixer Icon

Adjust the volume, record gain, and sidetone for microphone input.

Factory Default Settings	
Output	
Master Volume	-6dB
Sidetone	12dB
Input	
Input	None
Input Boost	Disabled
Record Gain	22.5dB

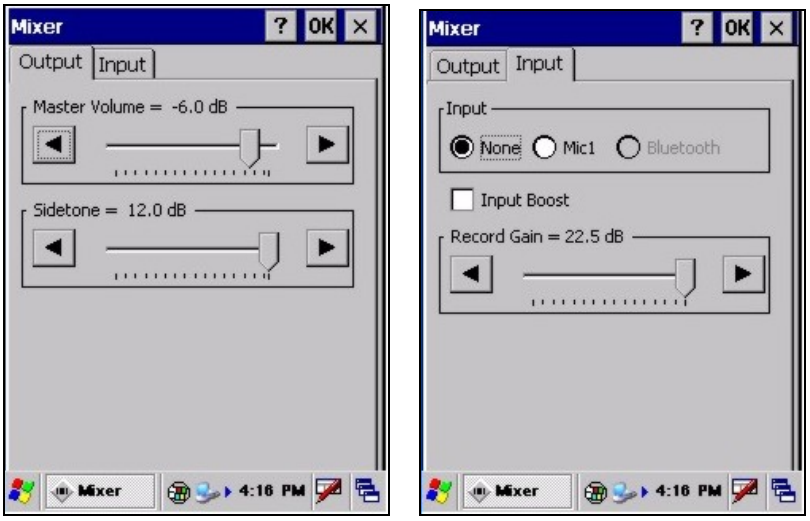


Figure 3-17 Mixer

Tap and hold the **Output** sliders, move them left and right to adjust the decibel level or tap the left and right arrows to adjust the sliders.

Enable Microphone — Enable the **Mic1** radio button and the **Input Boost** checkbox.

Disable Microphone — Enable the **None** radio button.

Tap OK to save the settings or tap the "X" button to ignore changes. Tap the "?" box for Help.

Mouse

Access: | Settings | Control Panel | Mouse

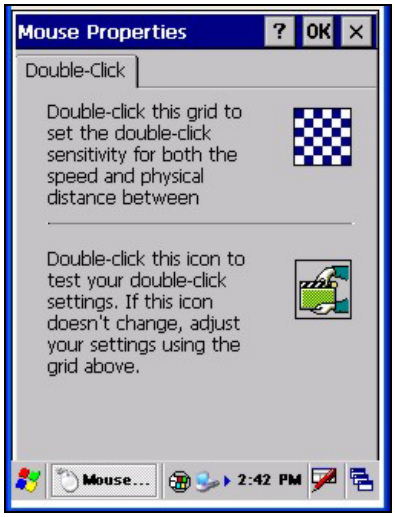

Mouse Properties
?
OK
Double-Click
Double-click this grid to set the double-click sensitivity for both the speed and physical distance between
Double-click this icon to test your double-click settings. If this icon doesn't change, adjust your settings using the grid above.
Mouse...
2:42 PM

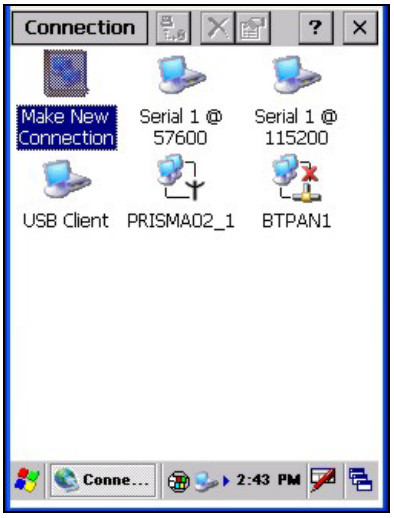
Figure 3-18 Mouse

Set the double-click sensitivity for stylus taps on the touchscreen. Tap OK to save the settings or tap the “X” button to ignore changes. Tap the “?” box for Help.

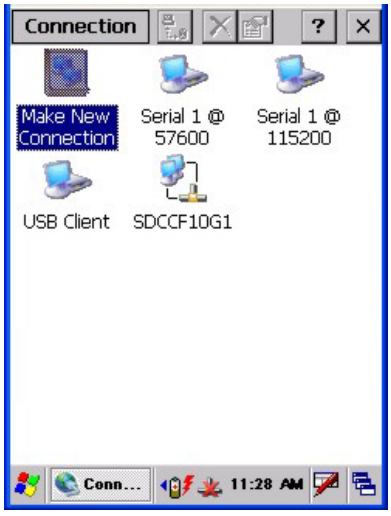
Network and Dialup Connections

Access: | **Settings | Control Panel | Network and Dialup Connections**

Set network driver properties and network access properties. Select a connection to use, or create a new connection on the MX7.



Odyssey Client Connection Panel



Summit Client Connection Panel

Figure 3-19 Network and Dialup Connections

Tap OK to save the settings or tap the "X" button to ignore changes. Tap the "?" box for Help.

Create a Connection Option

1. On the mobile device, select | **Settings** | **Control Panel** | **Network and Dialup Connections**. A window is displayed showing the existing connections.
2. Assuming the one you want does not exist, double-tap **Make New Connection**.
3. Give the new connection an appropriate name (My Connection @ 9600, etc.). Tap the **Direct Connection** radio button. Tap the Next button.
4. From the popup menu, choose the port you want to connect to. Only the available ports are shown.
5. Tap the **Configure...** button.
6. Under the **Port Settings** tab, choose the appropriate baud rate. Data bits, parity, and stop bits remain at 8, none, and 1, respectively.
7. Under the **Call Options** tab, be sure to turn off **Wait for dial tone**, since a direct connection will not have a dial tone. Set the timeout parameter (default is 5 seconds). Tap OK.
8. **TCP/IP Settings** should not need to change from defaults. Tap the **Finish** button to create the new connection.
9. Close the **Remote Networking** window.
10. To activate the new connection select | **Settings** | **Control Panel** | **PC Connection** and tap the **Change Connection…** button.
11. Select the new connection. Tap OK twice.

12. Close the Control Panel window.
13. Connect the desktop PC to the mobile device with the appropriate cable.
14. Click the desktop **Connect** icon to test the new connection.

You can activate the connection by double-tapping on the specific connection icon in the Remote Networking window, but this will only start an RAS (Remote Access Services) session, and does not start ActiveSync properly.

Owner

Access: | Settings | Control Panel | Owner Icon

Set the mobile device owner details.

Factory Default Settings	
Identification	
Name, Company, Address, Telephones	Blank
Display at power-on	Disabled
Notes	
Notes	Blank
Display at power-on	Disabled
Network ID	
User Name	Blank
Password	Blank
Domain	Blank

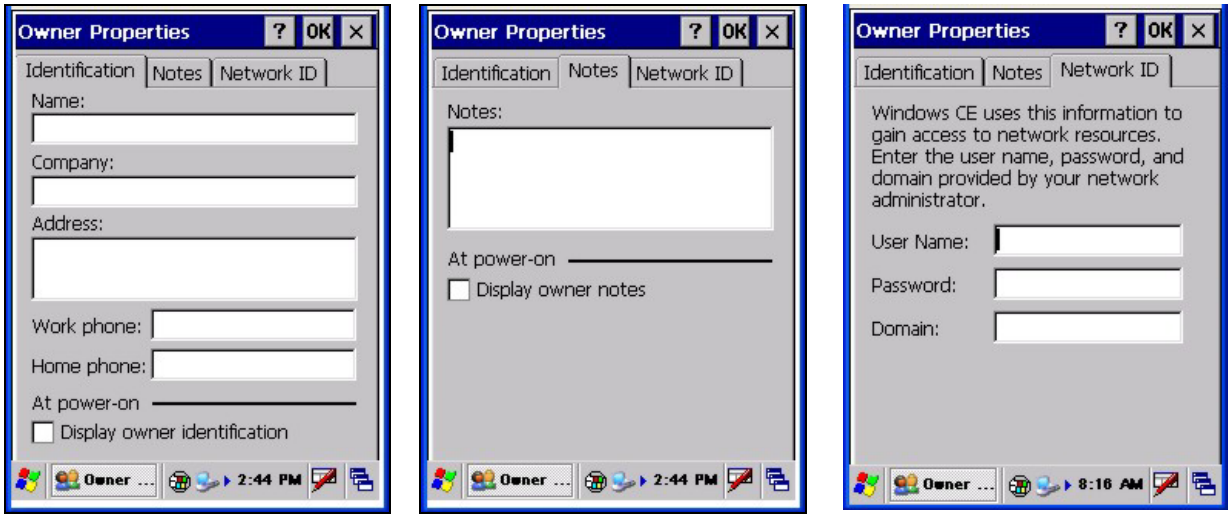


Figure 3-20 Owner Properties

Enter the information and tap the OK box to save the changes.

The changes take effect immediately.

Password

Access: | Settings | Control Panel | Password Icon

Set MX7 user access/power up password properties. Password and password settings are saved during a warm boot and a cold boot. The screensaver password affects the Remote Desktop screensaver only.

Factory Default Settings	
Password	Blank
Enter at Power On	Disabled
Enter at Screen Saver	Disabled

Note: Once a password is assigned, each Settings option requires the password be entered before each Settings option can be accessed.

Figure 3-21 Password

Enter the password in the Password textbox, then type it again to confirm it.

Enable the power-on checkbox and, if desired, the screensaver checkbox. Tap the OK button to save the changes. The password is in effect immediately.

The screensaver password is the same as the power-on password. They are not set independently. A screensaver password cannot be created without first enabling the "Enable password protection at power-on" checkbox. The screensaver password is not automatically enabled when the "power-on" checkbox is enabled.

Troubleshooting

The password must be entered before performing a coldboot or cold reset. If entering a power-on or screensaver password will not allow you to disable password protection or run COLDBOOT, contact LXE Technical Support.

PC Connection

Access: | Settings | Control Panel | PC Connection

Control the connection between the MX7 and a nearby desktop/laptop computer.

Factory Default Settings	
Enable direct connection	Enabled
Connect Using	'USB Client'

Tap the "Change Connection .." button to adjust the settings. Then tap the OK button to save the changes. The changes take effect immediately.

Unchecking the "Enable direct connections ….." disables ActiveSync.

Change Connection ….

Selecting Change Connection displays a list of configured ActiveSync connections.

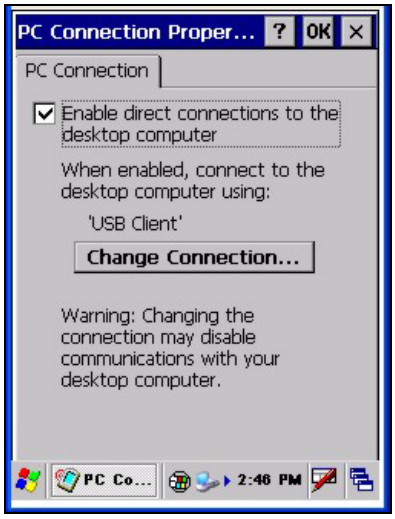


Figure 3-22 PC Connection

Please refer to the "Backup MX7 Files" section later in this chapter for parameter setting recommendations.

Power

Access: | Settings | Control Panel | Power

Please refer to Chapter 2 “Physical Description and Layout” section titled “Power Modes”.

Factory Default Settings		
Battery		
Turbo	Enabled	
Schemes		
AC Power	User Idle	2 minutes
AC Power	System Idle	2 minutes
AC Power	Suspend	5 minutes
Battery Power	User Idle	3 seconds
Battery Power	System Idle	15 seconds
Battery Power	Suspend	5 minutes

The mode timers are cumulative. The System Idle timer begins the countdown after the User Idle timer has expired and the Suspend timer begins the countdown after the System Idle timer has expired. When the User Idle timer is set to “Never”, the power scheme timers never place the device in User Idle, System Idle or Suspend modes (even when the device is idle).

Because of the cumulative effect, and using the Battery Power Scheme Defaults listed above:

- The backlight turns off after 3 seconds of no activity,
- The display turns off after 18 seconds of no activity (15sec + 3sec),
- And the device enters Suspend after 5 minutes and 18 seconds of no activity.

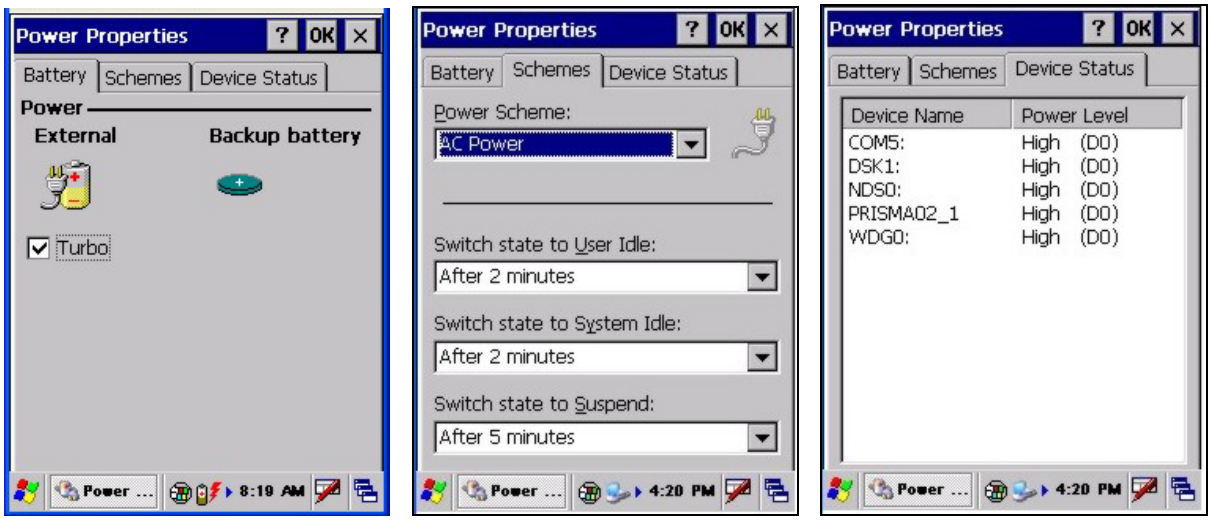


Figure 3-23 Power

Adjust the settings and tap the OK box to save the changes. Changes are saved across tabs. Tap the “X” box to discard any changes. Tap the “?” for Help. The changes take effect immediately.

Regional Settings

Access: | Settings | Control Panel | Regional Settings

Set the appearance of numbers, currency, time and date based on regional and language settings. Set the user interface language and the default input language.

Factory Default Settings	
Region	
Locale	English (United States)
Number	123,456,789.00 / -123,456,789.00 neg
Currency	$123,456,789.00 *pos* / ($123,456,789.00) *neg*
Time	h:mm:ss tt (tt=AM or PM)
Date	M/d/yy *short* / dddd,MMMM,dd,yyyy *long*
Language	
User Interface	English (United States)
Input	
Language	English (United States)-US
Installed	English (United States)-US

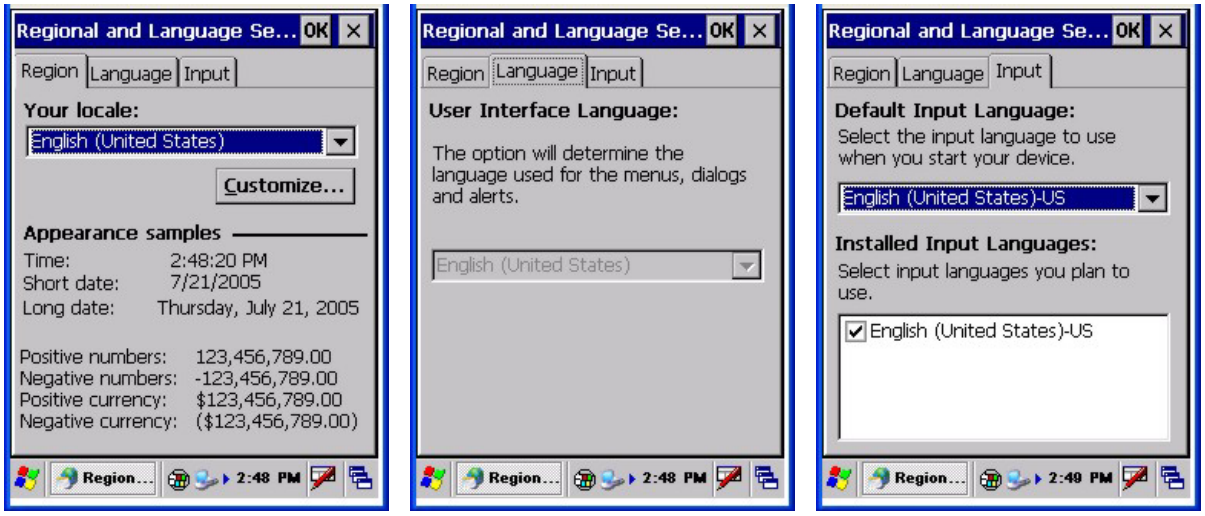


Figure 3-24 Regional Settings

Tap the Customize button to assign a different format for dates, times, numbers and currency. Adjust the settings and tap the OK box to save the changes. Changes are saved across tabs. Tap the "X" box to discard any changes. Tap the "?" for Help. The changes take effect immediately.

Remove Programs

Access: | Settings | Control Panel | Remove Programs

Note: Programs listed in this location are deleted upon warm and cold boot processes.

Select a program and tap Remove. Follow the prompts on the screen to uninstall ***user-installed only*** programs. The change takes effect immediately.

Files stored in the "My Documents" folder are not removed using this option.

Note: Do not remove LXE-installed programs using this option.

Scanner

Access: | Settings | Control Panel | Scanner

Set scanner keyboard wedge, scanner icon appearance, active scanner port, and scan key settings. Assign baud rate, parity, stop bits and data bits for available COM ports. Scanner parameters apply to the MX7 integrated scanner *only*. Barcode manipulation parameters apply to barcodes scanned by the integrated scanner engine *only*.

Factory Default Settings	
Main	
Port 1	Internal
Port 2	Disabled
Port 3	Disabled
Send key messages (WEDGE)	Enabled
Enable Internal Scanner Sound	Enabled
Good Scan Vibration	*Disabled / Long*
Bad Scan Vibration	*Disabled / Long*
COM1 Port (external serial port)	
Baud Rate	9600
Stop Bits	1
Parity	None
Data Bits	8
Barcode	
Use Advanced Barcode Processing	Disabled

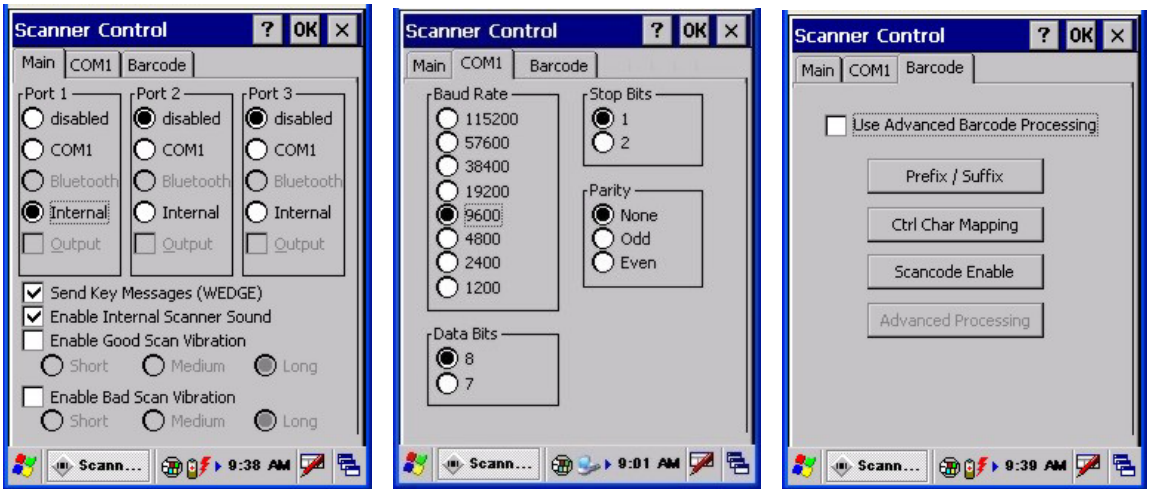


Figure 3-25 Scanner Control Panels

If "Send Key Messages …" is checked any data scan is converted to keystrokes and sent to the active window. When this box is not checked, the application will need to use the set of LXE Scanner APIs to retrieve the data from the scanner driver. Note that this latter method is significantly faster than using "Wedge".

Disable "Enable Internal Scanner Sound" when you want an application, not the scan engine or the CE operating system, to control scanner audible notifications. Adjust the settings and tap the OK box to save the changes. The changes take effect immediately.

Main Tab

Access: | Settings | Control Panel | Scanner | Main tab

Factory Default Settings	
Main	
Port 1	Internal
Port 2	Disabled
Port 3	Disabled
Send key messages (WEDGE)	Enabled
Enable Internal Scanner Sound	Enabled
Good Scan Vibration	Disabled / Long
Bad Scan Vibration	Disabled / Long

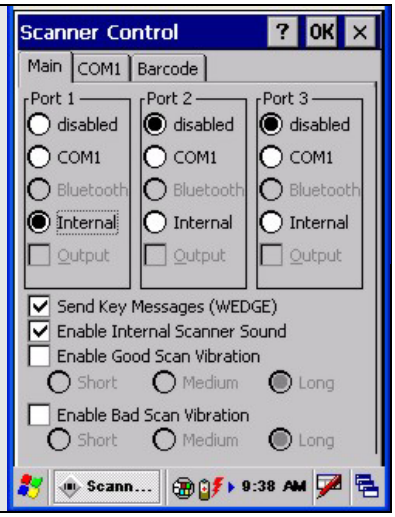


Figure 3-26 Scanner Panel - Main

Adjust the settings and tap the OK box to save the changes. The changes take effect immediately. Bluetooth is not supported by LXE.

Parameter	Function
Port	Port 1 – Internal. Radio button allows scanner input/output on Port 1 (scan key or trigger). Port 2 – Output is enabled when COM1 is enabled on this port. Port 3 - Output is enabled when COM1 is enabled on this port.
Send Key Messages (WEDGE)	The default setting is Enabled. This feature coexists with the Prefix/Suffix feature and the Advanced Control Character Mapping feature. Enable for Key Message mode, disable for Block Mode. Enable to use Advanced Control Character Mapping.
Enable Internal Scanner Sound	The default is Enabled. Functionality of the internal scanner driver engine includes audible tones on good scan (at the maximum db supported by the speaker), failed scan, and LED indication of a scan in progress. If enabled, Good Scan / Bad Scan Vibration provides a tactile response on a scan event. Disable this parameter when good scan/bad scan sounds are to be handled by alternate means e.g. application-controlled sound files.

Parameter	Function
Good Scan / Bad Scan Vibration	The default setting is Disabled. Enable this parameter when a tactile response on a good scan, bad scan or both event is desired. Scan sounds are accompanied by a tactile response when the internal scanner Sound parameter is enabled. Enable short, medium or long duration for each selection (good scan/bad scan).

COM1 Tab

Access: | Settings | Control Panel | Scanner | COM1 tab

Factory Default Settings	
COM1 Port (external serial port)	
Baud Rate	9600
Stop Bits	1
Parity	None
Data Bits	8

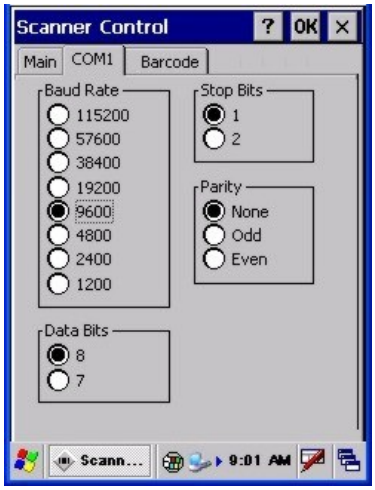


Figure 3-27 Scanner Panel – COM1

Integrated laser scanner default values are 9600 Baud, 8 data bits, 1 stop bit and No parity.

EV-15 scanner default values are 19200 Baud, 8 data bits, 1 stop bit and No parity.

If these values are changed, the default values are restored after a cold boot or reflashing.

Note: COM1 does not support 5V switchable power on Pin 9 for tethered scanners.

Barcode – Advanced - Prefix / Suffix

Access: | Settings | Control Panel | Scanner | Barcode tab

Prefix / Suffix is only available when *Use Advanced Barcode Processing* is disabled (default).

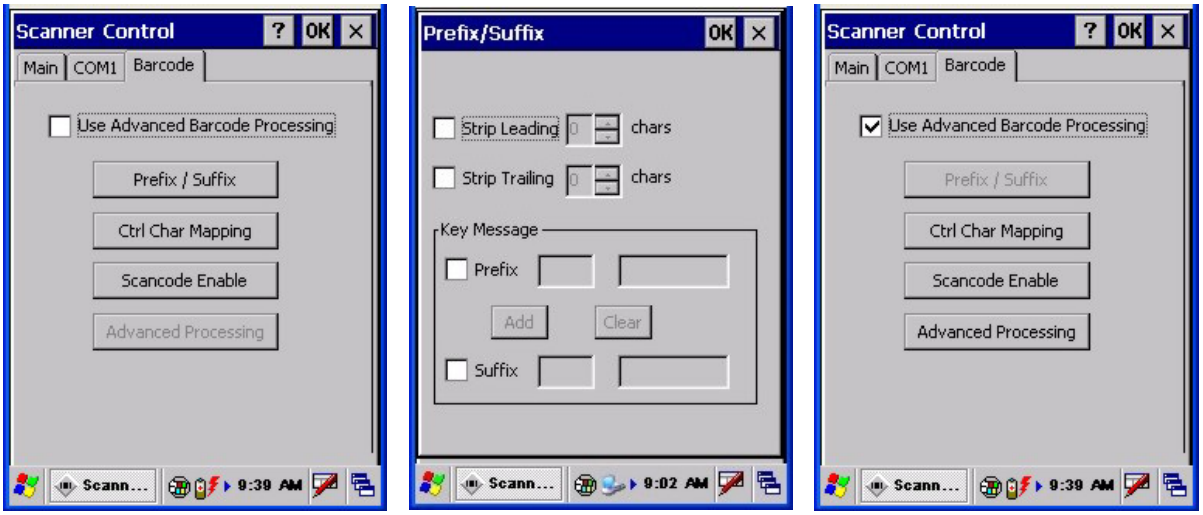


Figure 3-28 Barcode – Advanced – Prefix / Suffix

Prefix/Suffix (and pre-existing data) is ignored when *Use Advanced Barcode Processing* is enabled.

Strip Leading / Strip Trailing Characters

This feature, when enabled, strips the specified number of characters from a barcode, either from the beginning (leading) or at the end (trailing), or both.

When this feature and the Add Prefix and / or Add Suffix features are both enabled, the leading and trailing characters are stripped before the prefix or suffix is appended.

The configuration for stripping leading and trailing characters is specified independently. To enable, either or both of the checkboxes labeled Strip Leading and Strip Trailing must be checked. Then the number of characters to be stripped can be typed into the edit control or set using the spin control on the right of the edit control.

The maximum number of characters that can be stripped is 99 characters for each leading and trailing number of characters. When the Strip Leading and Strip Trailing checkboxes are blank (or disabled), the edit controls are disabled; however the last specified number of characters to strip is retained and dimmed.

When the number of characters to be stripped is greater than the number of characters in the barcode a good read beep is sounded but all barcode data is discarded.

Prefix / Suffix

If Add Prefix and / or Add Suffix are combined with Strip Leading and / or Strip Trailing, the leading and / or trailing characters are stripped before the prefix or suffix is added.

The mode for Prefix/Suffix feature is determined by the “Send Key Messages (WEDGE)” setting in the Main tab. When checked (enabled), the prefix/suffix feature is in *Key Message mode*. Key

message mode sends the prefix, barcode, and suffix to the application with the focus as keystrokes. In Key message mode all keys on the keypad can be entered.

When the "Send Key Messages" is not checked, *Block mode* is enabled. Block mode allows ASCII characters (0x0 – 0x7F), plus backspace, tab, delete, return and escape. In Block mode the prefix/suffix data is added to the beginning and end of the buffered barcode data that can then be read by an application from the WDG: device.

Up to 19 characters can be specified for the prefix and up to 19 characters can be specified for the suffix. The characters can be text or control characters, e.g. tab, carriage return. The characters can be entered into the prefix and suffix text boxes by typing from the keypad, entering the key's hex equivalent, or entering in hat (^) encoded delimited (8-bit code table) notation.

- To enable the Prefix or Suffix processing, check the associated checkbox. When the box is checked, the edit controls to the right are enabled. Keys/characters are typed into the edit control following the checkbox.
- Selecting the Add button then adds the key to the associated list of keys in the read-only edit control to the right of the Add / Clear buttons. The keys are shown as comma-delimited strings.
- To erase the Prefix or Suffix, select the read-only edit control that contains the currently configured Prefix or Suffix and select the Clear button.
- The Add and Clear buttons function on the control that is selected when the button is pressed.
- Hex values can be entered by preceding the two digit hex value with '0x'. Control characters can also be entered using the 'hat' delimited notation, i.e. ^M for Carriage Return.
- All keypad keys can be entered by typing the key. Some keypad keys are only valid if in "Key Message" mode. For example, the Function Keys (F1, PF1) are only valid in "Key Message" mode.

Interaction between Strip Leading/Trailing and Prefix/Suffix Settings

1. Replacements are not done on the Prefix and Suffix, only the barcode data, for both Block and Key Message mode. Control characters in the Prefix and Suffix are translated when Translate All is enabled.
2. Replacements are done on the barcode data and then characters are stripped for both Strip Leading and Strip Trailing features. As an example, suppose we have the following data and configuration:

   The barcode scanned begins with Group Separator (GS) followed by the character 'A'

   Group Separator is translated to 'GS'

   Strip Leading is set to 2

   In this case, the Group Separator is translated to 'GS' and then the 'GS' is stripped by the Strip Leading setting; rather than the Group Separator and 'A' being stripped.
3. If Translate All is enabled and replacements are assigned, the assigned replacements take precedence over the default one-to-one translation enabled by Translate all. For example if Translate All is enabled and Carriage Return is replaced by ^J, the value, 0x0d, in the barcode (prefix and suffix) are replaced with CTRL+Shift+J instead of CTRL+Shift+M keystrokes in Key Message mode.
4. Since the assigned replacements are applied before the Translate All is performed, if a control character is set to 'Ignore (drop)' by the assigned replacements, it is discarded

before the Translate All processing is performed and is therefore not translated.

5. Since the assigned replacements are applied before the Translate All is performed, if a control character is set to text by the assigned replacements, the text is substituted for the control character. In this case, the control character would not be in the data processed by the Translate All feature.

6. If the application that is accessing the Barcode Wedge in Block mode, supports Hat encoded characters, like ^M, hat encoded characters can be assigned in the defined action and then interpreted by the receiving application by using the 'escape' format described above. The same is true for hex-encoded characters.

Barcode - Advanced – Ctrl Char Mapping

Access: | Settings | Control Panel | Scanner | Barcode tab

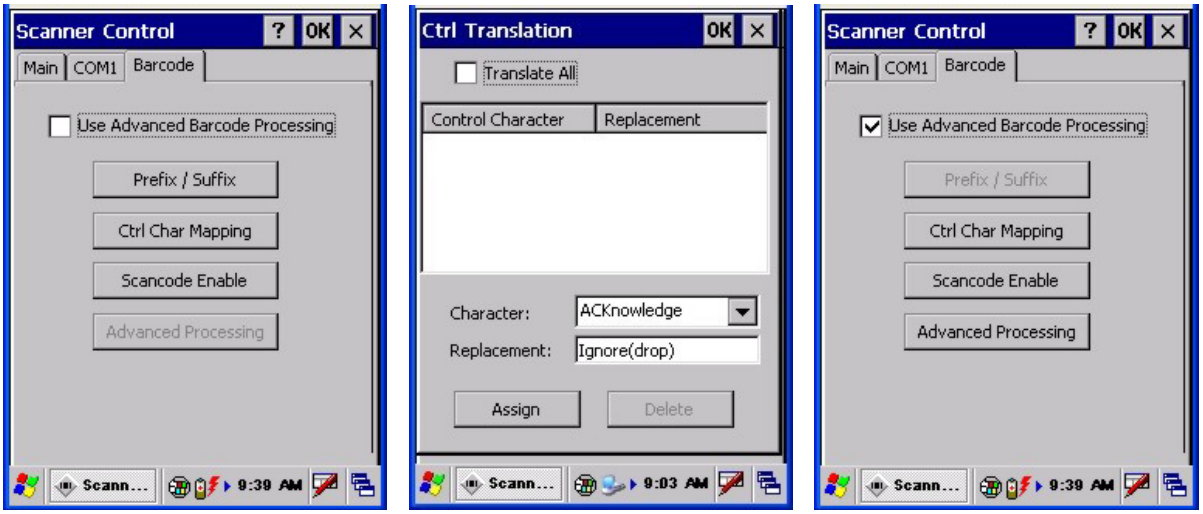


Figure 3-29 Barcode – Advanced – Ctrl Translation

Note that Control Character Mapping is available regardless of the status of the *Use Advanced Barcode Processing* checkbox.

See "Hat Encoding" and "Decimal-Hexadecimal Chart" at the end of this chapter.

Translate All

If "Translate All" is checked, unprintable ASCII characters (characters below 20H) in scanned barcodes are assigned to their appropriate CTRL code sequence when the barcodes are sent in Character mode.

When "Translate All" is not checked and "Send Key Messages" is checked, CTRL codes are passed through in Block mode.

The wedge provides a one-to-one mapping of control characters to their equivalent control+character sequence of keystrokes in Key Message mode. If a control character is replaced by another control character, the replacement is performed on the barcode data, prefix, and suffix before the keystrokes are simulated.

For example, if ‘Carriage Return’ is replaced by Line Feed (by specifying ‘^J’ or ‘0x0A’) in the configuration, the value 0x0d received in any scanned barcode (or defined in the prefix or suffix) will be replaced with the value 0x0a.

The Wedge then sends Ctrl+J to the receiving application, rather than Ctrl+M.

Translate All	This option is grayed unless the user has Key Message mode (on the Main tab) selected. In Key Message mode, when this option is enabled, control characters embedded in a scanned barcode are translated to their equivalent ‘control’ key keystroke sequence (13 [0x0d] is translated to Control+M keystrokes as if the user pressed the CTRL, SHIFT, and m keys on the keypad). It does not replace control characters in the prefix and suffix. The assignments provided by this enhancement allow the user to override the one-to-one translation provided by Translate All.
Character	This is a drop down combo box that contains the control character name. Refer to the table in “Assigned Replacements” for the list of control characters and their names. When a character name is selected from the combo box, the text ‘Ignore (drop)’ is shown and highlighted in the Replacement edit control. ‘Ignore (drop)’ is highlighted so the user can type a replacement if the control character is not being ignored. Once the user types into the Replacement edit control, reselecting the character form Character combo box redisplays the ‘Ignore (drop)’ default in the Replacement edit control.
Replacement	The edit control where the user types the characters to be assigned as the replacement of the control character. Replacements for a control character are assigned by selecting the appropriate character from the Character combo box, typing the replacement in the Replacement edit control (according to the formats defined above) and then selecting Assign. The assigned replacement is then added to the list box above the Assign button.
List Box	The list box shows all user-defined control characters and their assigned replacements. All replacements are enclosed in single quotes to delimit white space that has been assigned.
Delete	This button is grayed unless an entry in the list box is highlighted. When an entry (or entries) is highlighted, and Delete is selected, the highlighted material is deleted from the list box.

Barcode - Advanced – Scancode Enable

Access: | **Settings | Control Panel | Scanner | Barcode tab**

See the “Integrated Scanner Programming Guide”, section titled “Data Options” for full details on AIM Codes and Symbol Codes.

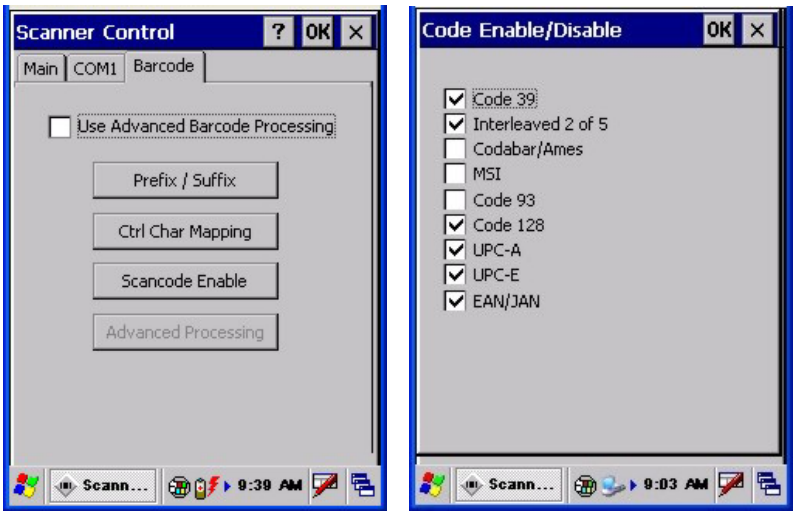


Figure 3-30 Barcode – Advanced – Scancode Enable/Disable

Note that Scancode Enable is available regardless of the status of the *Use Advanced Barcode Processing* checkbox.

This panel displays a list of all barcode symbologies supported by the integrated barcode scanner. Barcodes are sent to the application just as they are received from the scanner and before the ‘Strip Leading / Trailing’ or ‘Append Prefix / Suffix’ features.

Barcode - Advanced – Code ID

Access: | Settings | Control Panel | Scanner | Barcode tab

Note that the *Use Advanced Barcode Processing* checkbox must be enabled before Advanced Processing can occur.

See Also: The "Integrated Scanner Programming Guide", section titled "Data Options" for full details on AIM Codes and Symbol Codes.

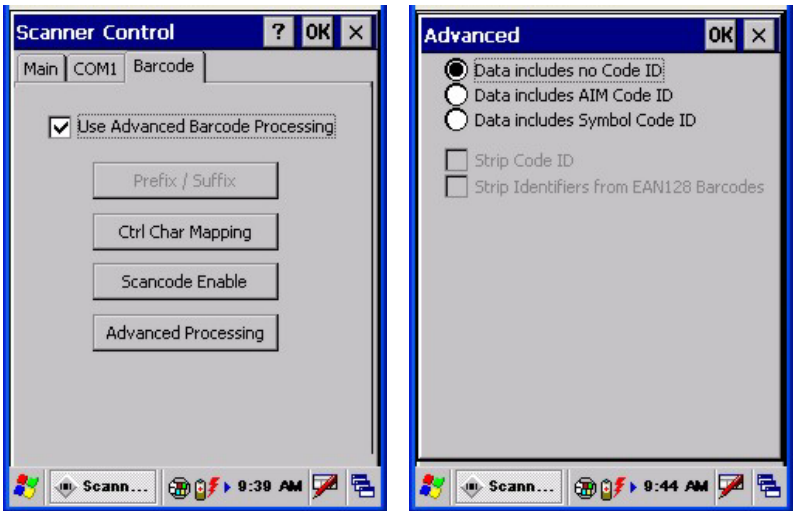


Figure 3-31 Barcode – Advanced Processing – No Code ID

Options on this Barcode and Advanced panels are not available if there is no integrated scanner, or a non-Symbol scan engine, installed in the MX7.

No Code ID

Default. All symbology IDs are transmitted. This means that by default, all good scan barcodes are sent to the application just as they are received from the scanner, regardless of any possible symbology ID attached. The *Strip Code ID* radio button is unavailable when No Code ID is enabled.

AIM Code ID

Enabling the Strip Code ID checkbox ensures the 3-character AIM Code ID symbology is stripped off by the WEDGE before the barcode is made available to the application. Disable *Data inludes Symbol Code ID* if the AIM Code ID parameter is enabled. When *Strip Code ID* is disabled (unchecked), the Code ID is included in the barcode data being matched.

Symbol Code ID

Enabling Strip Code ID ensures the 1-character Symbol Code ID symbology is stripped off by the WEDGE before the barcode is made available to the application. Disable *Data includes AIM Code ID* if the Symbol Code ID parameter is enabled. When *Strip Code ID* is disabled (unchecked), the Code ID is included in the barcode data being matched.

Strip Code ID

Enabling this parameter removes the number of characters (specified by AIM Code ID or Symbol Code ID radio button setting) before the barcode is sent to the application.

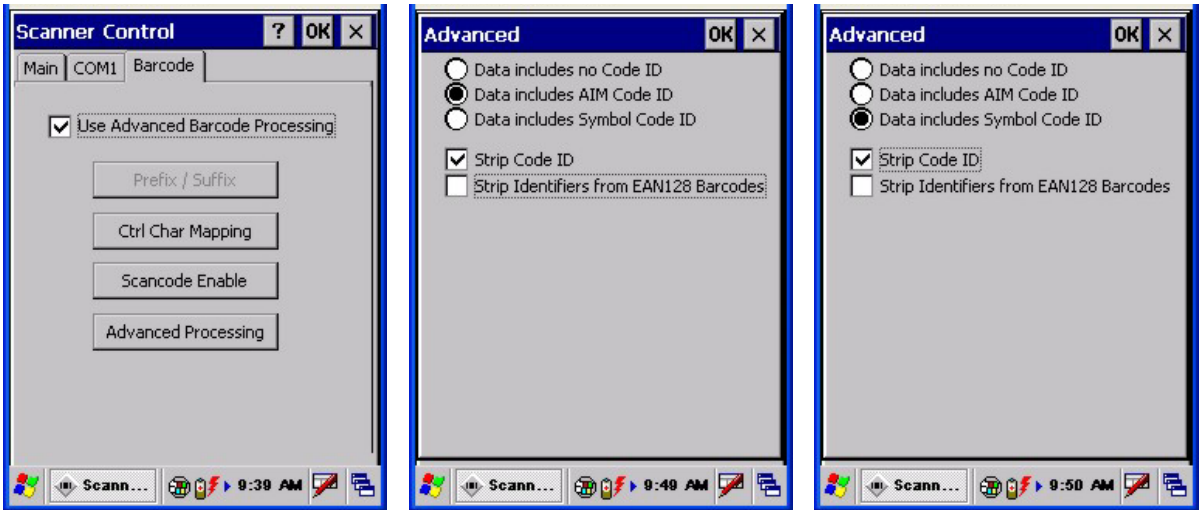


Figure 3-32 Barcode – Advanced Processing – Strip Code ID

This checkbox is unavailable when *Data includes no Code ID* radio button is enabled.

Strip Identifiers from EAN128 Barcodes

When *Strip Code ID* is disabled (unchecked), the AIM Code or Symbol Code ID is included in the barcode data being matched.

Scanned barcodes *are not matched* against the following parameters unless they are EAN128 barcodes. If the scan engine does not support EAN128 barcodes, or EAN128 barcodes have been disabled, the *Strip Identifiers from EAN128 Barcodes* function is not available.

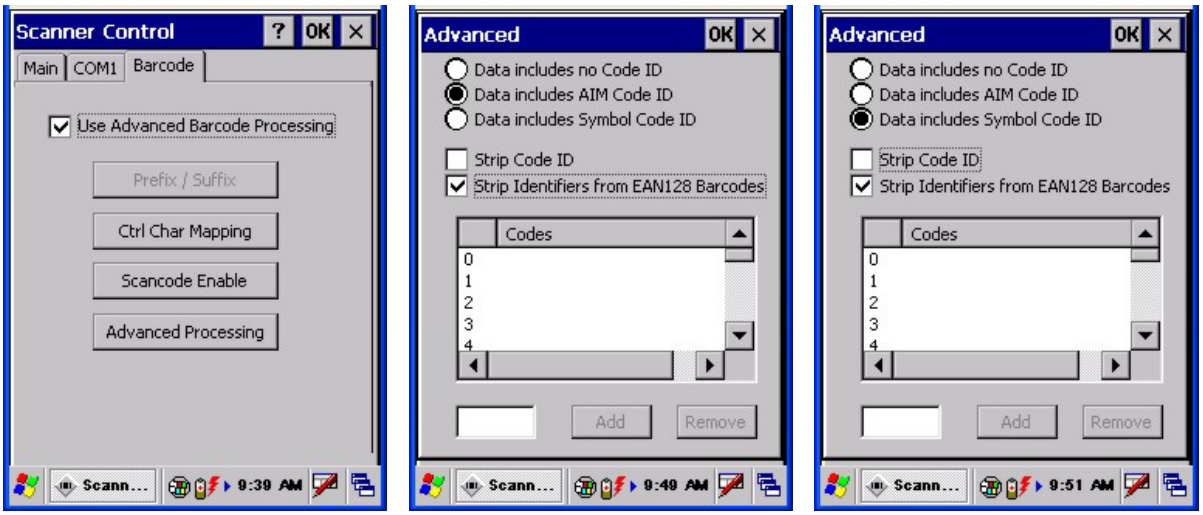


Figure 3-33 Barcode – Advanced Processing – EAN128 Barcodes

The user specifies whether the barcodes have an AIM Code ID (3 characters) or a Symbol Code ID (1 character). They also specify whether the AIM or Symbol Code ID will be stripped or passed through to the Codes match, **as long as the barcode is an EAN128 barcode**.

Adding Codes to the Match List for EAN128 Barcodes

The first elements of an EAN128 barcode are matched against the entries in the Match Code list, in the order entered in the list. For example, if the match code list contains *Item 0 ABC, Item 1 C* and *Item 2 AB* in that order, the *AB* has no effect. When a match is found (e.g. Code ID *A* was matched by *Item 0 ABC* and the process terminated) or when the end of the list is reached, processing terminates.

Up to 20 Codes (up to 16 characters each) can be added to the Match list. The characters can be text or control characters, e.g. tab, carriage return. The characters can be entered into the Match Code List text box by typing from the keypad, entering the key's hex equivalent, or entering in hat (^) encoded delimited (8-bit code table) notation.

- Keys/characters are typed into the lower left text box.
- To add a match code, move the cursor to the lower left text box. Add the characters to the box and select the Add button to place the new Match Code in the List Box.
- To edit a match code, highlight the match code in the List Box and double-click. The match code text is moved to the lower left text box. Make changes to the copied match code and select the Add button.
- To delete a match code, highlight the code in the List Box and select the Remove button. The match code is deleted from the list.
- After adding, editing or removing match codes, perform the Suspend/Resume function to store your changes in the registry.
- Hex values can be entered by preceding the two digit hex value with '0x'. Control characters can also be entered using the 'hat' delimited notation, i.e. ^M for Carriage Return. See "Hat Encoding" and "Decimal-Hexadecimal Chart" at the end of this chapter.
- All keypad keys can be entered by typing the key.

Note: No matching is done for barcodes using this option if they are not EAN128 barcodes.

Stylus

Access: | Settings | Control Panel | Stylus

Set double-tap sensitivity properties and/or calibrate the touch panel.

Double Tap

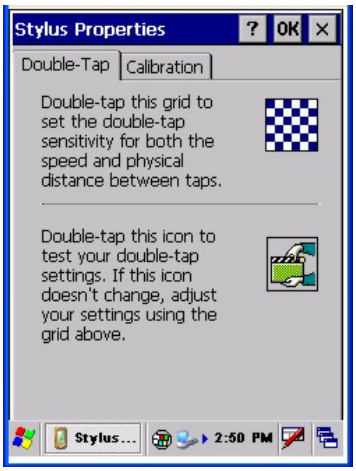

Stylus Properties
OK
Double-Tap
Calibration
Double-tap this grid to set the double-tap sensitivity for both the speed and physical distance between taps.
Double-tap this icon to test your double-tap settings. If this icon doesn't change, adjust your settings using the grid above.
Stylus...
2:50 PM

Figure 3-34 Stylus - Double-Tap

Follow the instructions on the screen and tap the OK box to save the changes. The double-tap changes take effect immediately.

Calibration

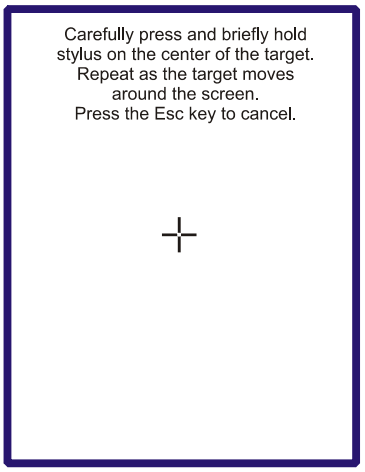

Carefully press and briefly hold stylus on the center of the target.
Repeat as the target moves around the screen.
Press the Esc key to cancel.

Figure 3-35 Stylus - Calibrate

Press and hold the stylus on the center of the target as it moves around the screen. Press Enter to keep the new calibration settings or Esc to cancel.

System

Access: | Settings | Control Panel | System Icon

Review System and mobile device data and revision levels. Adjust Storage and Program memory settings.

Factory Default Settings	
General	N/A
Memory	1/3 storage, 2/3 program memory
Device Name	MX7001
Device Description	LXE_MX7

General

Figure 3-36 System - General

System: This screen is presented for information only. The System parameters cannot be changed by the user.

Computer: The processor type is listed. The type cannot be changed by the user. Total computer memory and the identification of the registered user is listed and cannot be changed by the user.

Memory sizes given do not include memory used up by the operating system. Hence, a system with 128 MB may only report 99 MB memory, since 29 MB is used up by the Windows CE operating system. This is actual DRAM memory, and does not include internal flash used for storage.

Memory

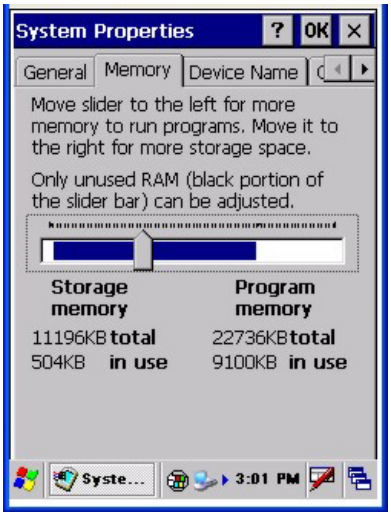


Figure 3-37 System - Memory

Move the slider to allocate more memory for programs or storage. If there isn't enough space for a file, increase the amount of storage memory. If the MX7 is running slowly, try increasing the amount of program memory. Adjust the settings and tap the OK box to save the changes. The changes take effect immediately.

Device Name

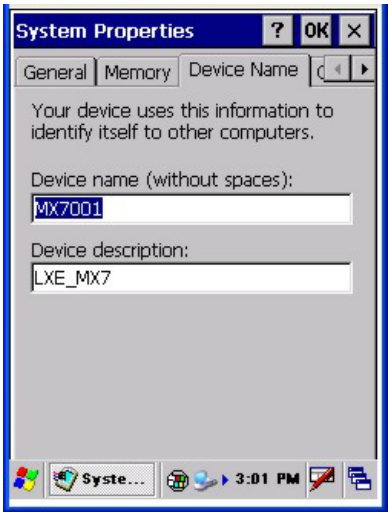


Figure 3-38 System - Device Name

The device name and description can be changed. Enter the name and description using either the keypad or the Input Panel and tap OK to save the changes. The changes take effect immediately.

Copyrights

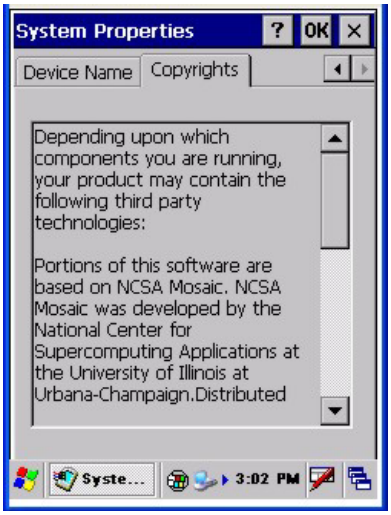

System Properties
OK
Device Name
Copyrights
Depending upon which components you are running, your product may contain the following third party technologies:
Portions of this software are based on NCSA Mosaic. NCSA Mosaic was developed by the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign.Distributed
Syste...
3:02 PM

Figure 3-39 System - Copyrights

This screen is presented for information only. The Copyrights information cannot be changed by the user.

Volume and Sounds

Access: | Settings | Control Panel | Volume & Sounds

Set volume parameters and assign sound wav files to CE events.

Factory Default Settings	
Volume	
Events	Enabled
Application	Enabled
Notifications	Disabled
Volume	Middle of Bar
Key click	Disabled
Screen tap	Disabled
Sounds	
Scheme	LOUD!

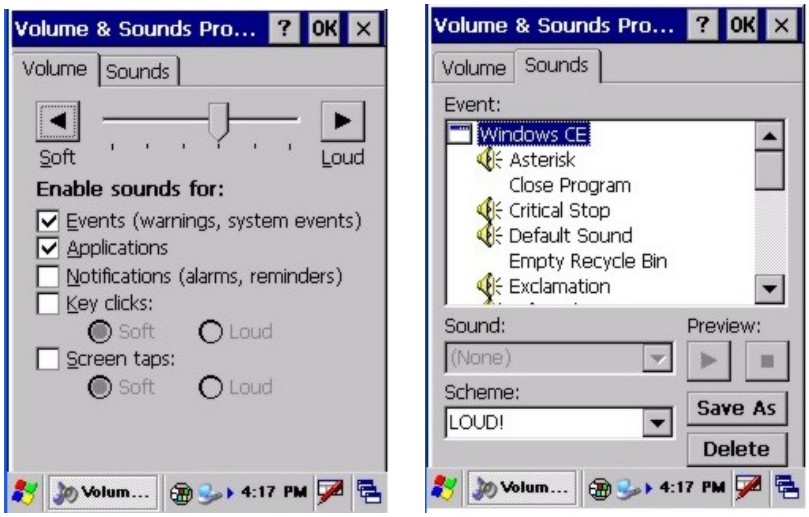


Figure 3-40 Volume & Sounds

Follow the instructions on the screen and tap the OK box to save the changes. The changes take effect immediately.

Good Scan and Bad Scan Sounds

Good scan and bad scan sounds are stored in the Windows directory, as SCANGOOD.WAV and SCANBAD.WAV. These are unprotected WAV files and can be replaced by a WAV file of the user's choice. By default a good scan sound on the mobile device is a single 2700 Hz beep, and a bad scan sound is a double beep.

SD Flash Cards, CAB Files and Programs

The Flash card, located under the main battery pack, is intended to protect the user from losing the LXE drivers and configuration information in the event of a cold boot. Also, on any boot, the contents of any registered CAB files are automatically unpacked.

Access Files on the Flash Card

Tap the **My Device** icon on the Desktop then tap the **System** icon.

Files

A flash card is used for permanent storage of the LXE drivers and utilities. It is also used for registry content back up. The flash card is located in the socket under the main battery pack.

CAB files, when executed, are not deleted..

LXECR1.CAB	Driver for LXE 802.11 radio
LXECR1A.CAB	Additional file for radio operation
ODYSSEY.CAB	Odyssey Client files needed for radio operation
SUMMIT.CAB	Summit Client files needed for radio operation.
The following CAB files are optional and may or may not be present:	
RFTERM.CAB	RFTerm terminal emulation application.
JAVA.CAB	Java application.
APPLOCK.CAB	AppLock program. See Chapter 4 “AppLock”.
LXELOGIN.LXE	Persistent user login utility installed by customer with Odyssey Client and becomes LXELOGIN.CAB

Note: Always perform a warm reset (Start / Run / Warmboot) when exchanging one flash card for another.

ActiveSync / Get Connected Process

Introduction

Requirement: ActiveSync version 3.7 (or higher) must be on the host (desktop/laptop, PC) computer.

A partnership between a PC and the MX7 must be established using serial RS-232 or USB connection. When more than one PC will be synchronizing with the MX7, each PC will need its own partnership with the MX7 established. See section titled “Initial Install” for the procedure.

After the partnership has been established with the MX7 and the host computer, ActiveSync can be performed over serial, USB, or radio (RF).

Using Microsoft ActiveSync version 3.7 or higher, you can synchronize information on your PC with the MX7 and vice versa. Synchronization compares the data on the MX7 with the PC and updates both with the most recent data. For example, you can:

- Synchronize Microsoft Word and Microsoft Excel files between your mobile device and PC. Your files are automatically converted to the correct format.
- Back up and restore your mobile device data.
- Copy (rather than synchronize) files between your mobile device and PC e.g. the MX7 LXEbook (the user’s guide in CE compatible format).
- Control when synchronization occurs by selecting a synchronization mode. For example, you can synchronize continually while connected to your PC or only when you choose the synchronize command.
- Select which information types are synchronized and control how much data is synchronized.

Note: By default, ActiveSync does not automatically synchronize all types of information. Use ActiveSync Options to specify the types of information you want to synchronize. The synchronization process makes the data (in the information types you select) identical on both your PC and your mobile device. If an information type is selected that does not exist on the MX7, the data appears to transfer, but it is ignored by the MX7 and not loaded.

When installation of ActiveSync is complete on your PC, the ActiveSync Setup Wizard begins and starts the following processes:

- connect the mobile device to your PC,
- set up a partnership so you can synchronize information between your mobile device and your PC, and
- customize your synchronization settings.

For more information about using ActiveSync on your PC, open ActiveSync, then open ActiveSync Help .

Initial Install

Initial installation / relationship must be established using serial RS232 or USB cable connection between the MX7 and the desktop/laptop (PC). Once a relationship has been established, tap | **Help | ActiveSync** for help.

Install ActiveSync on Desktop/Laptop

Go to the Microsoft Windows website ActiveSync Download | Install file location:

www.microsoft.com/downloads

and type ActiveSync in the Keywords text box. This process should locate the latest version of ActiveSync.

Install ActiveSync 3.7 (or later) on the PC before using ActiveSync to connect the PC to the mobile device.

Follow the instructions in the ActiveSync Wizard.

Check that | **Programs | Communication | ActiveSync | Tools | Options** has the correct connection selected. Refer to "Serial Connection" or "USB Connection".

When installation of ActiveSync is complete on your PC, the ActiveSync Setup Wizard on the PC begins and it begins searching for a connected device.

Because ActiveSync is already installed on your mobile device, your first synchronization process begins automatically when you finish setting up your PC in the ActiveSync wizard and, using the USB cable, connect your mobile device to the PC.

Serial Connection

Tap the | **Settings | Control Panel | PC Connection** on the MX7. Tap the **Change Connection** button. From the popup list, choose

COM 1 @ 57600

Note: The default is USB. LXE does not recommend using serial ActiveSync at 115 Kb/s.

This will set up the MX7 to use COM 1. Tap OK and ensure the check box for "Enable direct connections to the desktop computer" is checked.

Tap OK to return to the Control Panel.

USB Connection

Tap the | **Settings | Control Panel | PC Connection** on the MX7. Tap the Change Connection button. From the popup list, choose

USB Default

This will set up the MX7 to use the USB configuration. Tap OK and ensure the check box for "Enable direct connections to the desktop computer" is checked.

Tap OK to return to Settings.

Connect -- Initial Install Process

Connect the correct** cable to the PC (the host) and the MX7 (the client). Tap the | **Programs | Communication | Connect** icon on the MX7.

The MX7 connection is made using | **Programs | Communication | ActiveSync.**

** Cables for initial ActiveSync Configuration:

USB Client to PC/Laptop	MX7A052MULTICBLUSB
Serial Client to PC/Laptop	MX7A055MULTICBLDA9F

When the desktop/laptop computer and the MX7 successfully connect, the initial ActiveSync process is complete.

Change Connection Parameters

Tap the | **Settings | Control Panel | PC Connection**. Tap the **Change Connection** button. From the popup list, choose

Option	Description
USB (Default)	This will set up the MX7 to use the USB port direct.
COM1 @ 57600	This will set up the MX7 to use COM 1 direct at 57600 baud

- Tap OK and ensure the check box for "Enable direct connections to the desktop computer" is checked.
- Tap OK to return to Settings.
- Select Scanner and ensure the integrated scanner is set to a port that is different than the "Connect" port (COM 1).

Backup MX7 Files

Use the following to backup data files from the MX7 to a desktop or laptop PC using the appropriate cables and Microsoft's ActiveSync.

Prerequisites

Initial ActiveSync partnership between the MX7 and the target PC has been completed. After the partnership has been established with the mobile device and the host computer, ActiveSync can be performed over Serial, USB, or radio (RF).

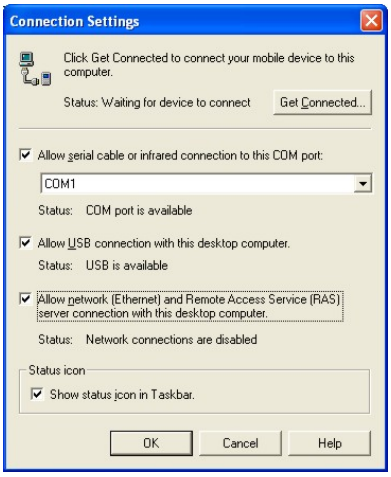

Connection Settings
Click Get Connected to connect your mobile device to this computer.
Status: Waiting for device to connect
Get Connected...
Allow serial cable or infrared connection to this COM port:
COM1
Status: COM port is available
Allow USB connection with this desktop computer.
Status: USB is available
Allow network (Ethernet) and Remote Access Service (RAS) server connection with this desktop computer.
Status: Network connections are disabled
Status icon
Show status icon in Taskbar.
OK
Cancel
Help

Figure 3-41 ActiveSync Connection Settings on a Windows PC

MX7 and PC Partnership

An ActiveSync partnership between the PC and MX7 has been established. See section “Initial Setup”.

Serial Port Transfer

- A PC with an available serial port and an MX7 with a serial cable. The desktop or laptop PC must be running Windows 95, 98, NT, 2000 or XP.
- “Allow serial cable or infrared connection to this COM port” is checked.
- Null modem cable with all control lines connected. LXE recommends using the RS-232 cable listed in the following section “Connect”..

USB Transfer

- A PC with an available USB port and an MX7 with a USB cable. The desktop or laptop PC must be running Windows 98 SR2, Windows 2000 or Windows XP.
- LXE-specific USB cable as listed in the following section “Connect”.
- “Allow USB connection with this desktop computer” is checked.

Radio (RF) Transfer

- A PC or laptop with a radio card or wireless connection.
- The "Allow network (Ethernet) and Remote Access Service (RAS) server connection with this desktop computer" is checked.

Connect

Connect the correct cable to the PC (the host) and the MX7 (the client).

Select "Connect" from | **Programs** | **Communications** | **Connect**.

Cable, Multipurpose USB and Power	MX7A052MULTICBLUSB
Cable, Multipurpose RS-232 and Power	MX7A055MULTICBLDA9F

Note: USB will start automatically when the cable is connected.

Explore

From the ActiveSync Dialog on the Desktop PC, click on the Explore button, which allows you to explore the MX7 from the PC side, with some limitations.

You can copy files to or from the MX7 using drag-and-drop.

You will not be allowed to delete files or copy files out of the \Windows directory on the MX7. (Technically, the only files you cannot delete or copy are ones marked as system files in the original build of the Windows OS image. This, however, includes most of the files in the \Windows directory).

For example, you can drag the "LXEbook – MX7 User's Guide" from your desktop computer to the My Documents folder on the MX7.

Disconnect

Serial Connection

- Disconnect the cable from the MX7.
- Put the MX7 into suspend by tapping the red Power button.
- Click the status bar icon in the lower right hand corner of the PC's status bar. Then click the Disconnect button.

USB Connection

- Disconnect the cable from the MX7.
- Click the status bar icon in the lower right hand corner of the PC's status bar. Then click the Disconnect button.

IMPORTANT - Do not put the MX7 into suspend while connected via USB. The MX7 will be unable to connect to the host PC when it resumes operation.

Radio Connection

- Put the MX7 into Suspend Mode by tapping the red Power button.
- Click the status bar icon in the lower right hand corner of the PC's status bar. Then click the Disconnect button.

Cold Boot and Loss of Host Re-connection

ActiveSync assigns a partnership between a mobile device and a PC. A partnership is defined by two objects -- a unique computer name and a random number generated when the partnership is first created. An ActiveSync partnership for a unique client can be established to two hosts.

If the MX7 is cold booted, the random number is deleted – and the partnership with the last one of the two hosts is also deleted. The host retains the random numbers and unique names of all devices having a partnership with it. Two clients cannot have a partnership with the same host if they have the same name. (**| Settings | Control Panel | System | Device Name**)

If the cold booted MX7 tries to reestablish the partnership with the same host PC, a new random number is generated for the MX7 and ActiveSync will insist the unique name of the MX7 be changed. If the MX7 is associated with a second host, changing the name will destroy *that* partnership as well. This can cause some confusion when re-establishing partnerships with hosts.

ActiveSync Troubleshooting

ActiveSync on the host returns to the Get Connected screen without connecting to the cabled device.

If the MX7 is connected to a PC by a cable, disconnect the cable from the MX7 and reconnect it again.

Check that the correct connection is selected (Serial or USB "Client" if this is the initial ActiveSync installation).

See Also: "Cold Boot and Loss of Host Reconnection".

ActiveSync on the host says that a device is trying to connect, but it cannot identify it

One or more control lines are not connected. This is usually a cable problem, but on a laptop or other device, it may indicate a bad serial port.

Try the following to re-establish the connection:

On the Host (desktop or laptop PC)

1. Open ActiveSync.
2. Select File | Connection Settings and disable "Allow serial cable or infrared connection to this COM port".
3. Click OK.
4. Select File | Connection Settings and enable "Allow serial cable or infrared connection to this COM port".

On the MX7

Tap Start | Programs | Communication | Connect to establish an ActiveSync connection to the host.

ActiveSync indicator on the host (disc in the toolbar tray) turns green and spins as soon as you connect the cable, before tapping the Connect icon.

One or more control lines are tied together incorrectly. This is usually a cable problem, but on a laptop or other device, it may indicate a bad serial port.

ActiveSync indicator on the host turns green and spins, but connection never occurs

Baud rate of connection is not supported or detected by host.

-or-

Incorrect or broken data lines in cable.

ActiveSync indicator on the host remains gray

The host doesn't know you are trying to connect. May mean a bad cable, with no control lines connected, or an incompatible baud rate. Try the connection again, with a known-good cable.

Testing connection with a terminal emulator program, or a serial port monitor

You can use HyperTerminal or some other terminal emulator program to do a rough test of ActiveSync. Set the terminal emulator to 8 bits, no parity, 1 stop bits, and the same baud rate as the connection on the CE device. After selecting Start | Programs | Communication | Connect on the CE device, the word "CLIENT" appears on the CE display in ASCII format. When using a serial port monitor, you see the host echo "CLIENT", followed by "SERVER". After this point, the data stream becomes straight (binary) PPP.

Drop down list is blank in the ActiveSync dialog box

The radio link is broken. Make sure that the radio has a valid IP address.

Utilities

These utilities are pre-loaded by LXE.

LAUNCH.EXE

All applications to be installed into memory are normally in the form of Windows CE CAB files. The CAB files exist as separate files from the main installation image, and need to be copied to the mobile device using an internal Flash card or from a PC using ActiveSync. The CAB files are loaded into the folder **System**, which is the internal Flash drive.

Then, information is added to the registry, if desired, to make the CAB file auto-launch at startup. The CAB file can update the registry as desired and cause the unpacked file(s) to be placed in the appropriate location.

The registry information needed is under the key *HKEY_LOCAL_MACHINE \ SOFTWARE \ LXE \ Persist*, as follows. The main subkey is any text, and is a description of the file. Then 3 values are added:

FileName is the name of the CAB file, with the path (usually \System)
Installed is a DWORD value of 0, which changes to 1 once auto-launch installs the file
FileCheck is the name of a file to look for to determine if the CAB file is installed.

The value in FileCheck is the name of one of the files (with path) installed by the CAB file. Since the CAB file installs into DRAM, when memory is lost this file is lost, and the CAB file must be reinstalled.

Three optional fields are also added: **Order**, **Delay**, and **PCMCIA**. These are all DWORD fields, described below.

The auto-launch process goes as follows. The launch utility opens the registry database and reads the list of CAB files to auto-launch. First it looks for **FileName** to see if the CAB file is present. If not, the registry entry is ignored. If it is present, and the **Installed** flag is not set, auto-launch makes a copy of the CAB file (since it gets deleted by installation), and runs the Microsoft utility WCELOAD to install it. If the **Installed** flag is set, auto-launch looks for the **FileCheck** file. If it is present, the CAB file is installed, and that registry entry is complete. If the **FileCheck** file is not present, memory has been lost, and the utility calls WCELOAD to reinstall the CAB file. Then, the whole process repeats for the next entry in the registry, until all registry entries are analyzed.

To force execution every time (for example, for **AUTOEXEC.BAT**), use a **FileCheck** of **"dummy"**, which will never be found, forcing the item to execute.

For persist keys specifying **.EXE** or **.BAT** files, the executing process will be started, and then **Launch** will continue, leaving the loading process to run independently. For other persist keys (including **.CAB** files), **Launch** will wait for the loading process to complete before continuing. This is important, for example, to ensure that a .CAB file is installed before the .EXE files from the .CAB file are run.

The **Order** field is used to force a sequence of events; **Order=0** is first, and **Order=99** is last. Two items which have the same order will be installed in the same pass, but not in a predictable sequence. Note: If the order of loading is not critical, it may be easier to use the \System\Startup folder instead; see below.

The **Delay** field is used to add a delay after the item is loaded, before the next is loaded. The delay is given in seconds, and defaults to **0** if not specified. If the install fails (or the file to be installed is not found), the delay does not occur.

The **PCMCIA** field is used to indicate that the file (usually a CAB file) being loaded is a radio driver, and the PCMCIA slots should be started after this file is loaded. By default, the PCMCIA slots are off on powerup, to prevent the "Unidentified PCMCIA Slot" dialog from appearing.

Once the drivers are loaded, the slot can be turned on. The value in the **PCMCIA** field is a DWORD, representing the number of seconds to wait after installing the CAB file, but before activating the slot (a latency to allow the thread loading the driver to finish installation). The default value of **0** means the slot is not powered on. The default values for the default radio drivers (listed below) is **1**, meaning one second elapses between the CAB file loading and the slot powering up.

Note that the auto-launch process can also launch batch files (***.BAT**), executable files (***.EXE**), registry setting files (***.REG**), or sound files (***.WAV**). The mechanism is the same as listed above, but the appropriate CE application is called, depending on file type.

Registry information is already in the default image for the following [2]:

```
;; ------- autoexec batch file - for users convenience
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\AUTOEXEC]
        "FileName"="\\System\\Autoexec.bat"
        "Installed"=dword:0
        "FileCheck"="ALWAYSEXEC"
        "Order"=dword:50

;; special function - makes Launch copy system folders from ATA drive
;; we put it in here so that we control when it happens (esp. for Applock)
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\COPYFOLDERS]
        "FileName"="COPYFOLDERS"
        "Installed"=dword:0
        "FileCheck"=""
        "Order"=dword:10

;; ------- Cisco radio support
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Cisco Radio]
        "FileName"="\\System\\CISCO.CAB"
        "Installed"=dword:0
        "FileCheck"="\\WINDOWS\\CISCO.DLL"
        "Order"=dword:2
        "PCMCIA"=dword:1

;; ------- Symbol radio support
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Symbol Radio]
        "FileName"="\\System\\SYMBOL.CAB"
        "Installed"=dword:0
        "FileCheck"="\\WINDOWS\\NICTT.EXE"
        "Order"=dword:2
        "PCMCIA"=dword:1

;; ------- LXE USB radio support
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\LXE USB Radio]
        "FileName"="\\System\\LXECR1.CAB"
        "Installed"=dword:0
        "FileCheck"="\\WINDOWS\\PRISMA02.DLL"
        "Order"=dword:2
        "PCMCIA"=dword:2

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Old LXE USB Radio]
```

[2] CAB files for options not purchased are not loaded e.g. JAVA or RFID. If a CAB file is missing, please contact your LXE Representative.

```
"FileName"="\\System\\LXEUSB.CAB"
"Installed"=dword:0
"FileCheck"="\\WINDOWS\\PRISMA02.DLL"
"Order"=dword:2
"PCMCIA"=dword:1

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Wifi Utility]
"FileName"="\\Windows\\Wifi_Utility.exe"
"Installed"=dword:0
"FileCheck"="ALWAYSEXEC"
"Order"=dword:20

;; ------- Summit radio support
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Summit Radio]
"FileName"="\\System\\SUMMIT.CAB"
"Installed"=dword:0
"FileCheck"="\\WINDOWS\\SDCCF10G.DLL"
"Order"=dword:2
"PCMCIA"=dword:1

;; ------- Odyssey support
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Odyssey]
"FileName"="\\System\\ODYSSEY.CAB"
"Installed"=dword:0
"FileCheck"="\\WINDOWS\\odysseyIMCE.DLL"
"Order"=dword:0E
"Delay"=dword:0

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Odyssey license]
"FileName"="\\System\\LXECR1A.CAB"
"Installed"=dword:0
"FileCheck"="\\WINDOWS\\odyssey.txt"
"Order"=dword:0D
"Delay"=dword:0

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Odyssey install]
"FileName"="\\System\\LXElogin.CAB"
"Installed"=dword:0
"FileCheck"="\\WINDOWS\\lxelogin.exe"
"Order"=dword:05
"Delay"=dword:0

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Odyssey login]
"FileName"="\\Windows\\LXElogin.exe"
"Installed"=dword:0
"FileCheck"="ALWAYSEXEC"
"Order"=dword:0F
"Delay"=dword:0
```

```
;; ------- RFTerm support
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\LXE TE]
        "FileName"="\\System\\RFTERM.CAB"
        "Installed"=dword:0
        "FileCheck"="\\WINDOWS\\LXE\\RFTERM.EXE"
        "Order"=dword:11

;; run the app after it has loaded and radio is ready
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\RFTERM]
        "FileName"="\\WINDOWS\\LXE\\RFTERM.EXE"
        "Installed"=dword:0
        "FileCheck"="ALWAYSEXEC"
        "Order"=dword:40
        "Delay"=dword:1

;; ------- RFID support
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\RFID]
        "FileName"="\\System\\RFID.CAB"
        "Installed"=dword:0
        "FileCheck"="\\WINDOWS\\RFID_WDG.DLL"
        "Order"=dword:0C

;; ------- Avalanche support
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Avalanche]
        "FileCheck"="\\System\\avalanche\\model.dat"
        "Installed"=dword:0
        "Order"=dword:4
        "FileName"="\\System\\LXEAVA.CAB"

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\AvaLaunch]
        "Order"=dword:5
        "FileName"="\\System\\Avalanche\\Avainit.exe"
        "FileCheck"="ALWAYSEXEC"
        "Installed"=dword:0

;; ------- Applock support
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\AppLockInstall]
        "FileName"="\\System\\AppLock.CAB"
        "Installed"=dword:0
        "FileCheck"="\\WINDOWS\\APPLOCK.EXE"
        "Order"=dword:0

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\AppLockPrep]
        "FileName"="\\windows\\AppLockPrep.exe"
        "Installed"=dword:0
        "FileCheck"="ALWAYSEXEC"
        "Order"=dword:1
        "Delay"=dword:2

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\AppLock]
        "FileName"="\\windows\\AppLock.exe"
        "Installed"=dword:0
        "FileCheck"="ALWAYSEXEC"
        "Order"=dword:63
```

```
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\KbdLocks]
    "FileName"="\\windows\\KbdLocks.exe"
    "Installed"=dword:0
    "FileCheck"="ALWAYSEXEC"
    "Order"=dword:62
```

When you are installing your custom CAB file to the mobile device's operating system, refer to the default image segments that are commented with "… RFTERM …" to see the expected Registry format.

One special key is included to force the system folders (Desktop, Fonts, Programs, etc.) to copy from the internal ATA card (**\System**) to the **\Windows** directory. This is implemented as a persist key so the sequence of startup events can be controlled (especially for AppLock). The filename is a special internal trigger for the Launch utility, to activate the **CopyFolders** function. *DO NOT EDIT OR ALTER THIS KEY, OR IT MAY NO LONGER FUNCTION.* You may however change the **Order** or **Delay** values if necessary for a particular startup sequence.

```
[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\COPYFOLDERS]
    "FileName"="COPYFOLDERS"
    "FileCheck"=""
    "Order"=dword:0F
```

To have files (CAB, EXE, REG, or WAV files) loaded on startup, when sequence of execution is not important, you can put these files in the \System\Startup folder (on the internal Flash card). This is parsed by the Launch utility, and these programs are started or executed.

REGEDIT.EXE

Before using REGEDIT.EXE, please refer to commercially available Microsoft Power Tools for Windows manuals . For example Microsoft Windows Registry Guide, Second edition.

The Registry Editor allows viewing, searching for items and changing settings in the registry. The registry contains information about how the mobile device runs. LXE recommends **caution** when inspecting and editing the Registry as making incorrect changes can damage the mobile device operating system. LXE recommends making a backup copy of the registry before viewing or carefully making changes to the registry.

REGLOAD.EXE

Double-tapping a registry settings file (e.g. REG) causes RegLoad to open the file and make the indicated settings in the registry. This is similar to how RegEdit works on a desktop PC. The .REG file format is the same as on the desktop PC.

WARMBOOT.EXE

Double tap this file to warm boot the computer (i.e., all RAM is preserved). It automatically saves the registry before rebooting which means configuration changes are not lost.

WAVPLAY.EXE

Double-tapping a sound file (e.g. WAV) causes WavPlay to open the file and run it in the background.

Enabling GrabTime

The MX7 has a GrabTime utility which can automatically synchronize the MX7 with a time server (via an Internet connection) at boot up.

By default, using GrabTime for time synchronization at boot up is Off.

To enable GrabTime to run automatically at boot up, run \Windows\grabtime.reg and perform a warmboot. For more detail, see "LAUNCH.EXE", earlier in this chapter.

Note: This utility affects the behavior of GrabTime at warmboot. After a coldboot, GrabTime is disabled.

Configuring CapsLock Behavior

To set CapsLock status to On after a warmboot, run \Windows\CapsLockOn.reg and perform a warmboot.

To set CapsLock status to Off after a warmboot, run \Windows\CapsLockOff.reg and perform a warmboot.

Note: Setting CapsLock to On using this method does not display the CapsLock icon in the Windows CE taskbar. The current status of CapsLock can be changed with the CAPS key, however this method does not change CapsLock behavior upon reboot.

Note: These utilities affect the behavior of the CapsLock on warmboot. After a coldboot, CapsLock is disabled.

Configuring IPv6

By default, IPv6 is enabled and an IPv6 broadcast message is sent on power up.

To disable IPv6, run \Windows\ipv6Disable.reg and perform a warmboot.

To enable IPv6, run \Windows\ipv6Enable.reg and perform a warmboot.

Note: These utilities affect the behavior of IPv6 on warmboot. After a coldboot, IPv6 is enabled.

Launch App / Launch Command

The Launch App / Launch Command are defined for use by CE administrators. The VK_LAUNCH_APP1-4 and VK_LAUNCH_CMD1-4 keys are parsed and executed directly by the keyboard driver. They are configurable in registry keys to execute any desired function.

The CMD keys differ from the APP keys in that they call the ShellExecuteEx API, which lets them open documents directly; the APP keys only start EXE applications.

Note that executables and parameters are not checked for accuracy by the keyboard driver. If the launch fails, the mobile device emits a single beep, if the launch is successful, the mobile device is silent.

The registry keys are:

[HKEY_LOCAL_MACHINE\Software\LXE\Launch\App1] . . . . App2, App3, App4]
"Exe"="" [name of executable file]
"Opt"="" [options or parameters for executable file]

[HKEY_LOCAL_MACHINE\Software\LXE\Launch\Cmd1] . . . . Cmd2, Cmd3, Cmd4]
"File"="" [name of file]
"Parm"="" [parameters for file/exe execution]

See Also: Appendix A - Key Maps, "Creating Custom Key Maps" for more information.

Command-line Utility

Command line utilities can be executed by Start | Run | [program name].

COLDBOOT.EXE

Command line utility which performs a cold boot (all data in RAM is erased). The command is not case-sensitive.

Passwords are lost upon cold boot. If a password is set, that password must be entered to begin the cold boot power cycle process.

PrtScrn.EXE

Command line utility which performs a screen print and saves the file in .BMP format in the \System folder. Tap Start | Run | then type prtscrn and tap OK, or press Enter. There is a 10 second delay before the screen print is made. The device beeps and the captured screen file (scr*nnnnn*.bmp) is placed in the \System folder. The numeric filename is incremented by 1 each time the PrtScrn function is activated. The command is not case-sensitive.

LXE Login Utility

Odyssey Client only. The LXE Login Utility is installed on the mobile device by LXE; however, the MX7 is not configured to load the LXE Login Utility automatically. The LXE Login Utility is designed to let you specify an Odyssey Client login name for the currently selected profile.

The login prompt is displayed at system boot and when resuming from suspend. MX7 focus remains on the login prompt until it is dismissed. Nothing else can be done on the MX7 until the user responds to the login prompt.

Follow the instructions in the following section titled "Installation" to configure your MX7 to load the LXE Login Utility. After the installation instructions have been executed, the LXE Login Utility automatically loads after any warm or cold reset of the MX7. It is activated again on a resume from suspend mode.

Note: If it is necessary to remove the LXE Login Utility, LXE strongly recommends using the instructions in the section "Uninstall the LXE Login Utility" to stop the utility from running on the MX7.

Installation

The LXE Login Utility CAB file must be renamed. Follow the instructions below to rename the CAB.

*Note: File extensions must be enabled for viewing for the following procedure to work. To insure extensions are enabled for viewing, double tap **My Device** on the Desktop. Select the **View** menu and the select **Options**. Uncheck **Hide file extensions**.*

1. Double tap **My Device** on the Desktop.
2. Double tap **System**.
3. Use the scroll bar to locate **LXELogin.LXE**.
4. Tap and hold on LXELogin.LXE until the "right mouse-click" menu appears.
5. Select the **Rename** menu item. The stylus cursor changes to the input cursor (I) and **LXELogin.LXE** is highlighted.
6. Press the right arrow key to position the input cursor at the end of the input field.
7. Use the **BkSp** key to erase **LXE** from the filename.
8. Type **CAB** and press the **Enter** key.
9. Warm reset the mobile device by selecting **Run** from the **Start** menu, type **WARMBOOT** in the Open edit control panel and press the **Enter** key.

Using the Utility

If multiple Profiles are configured on the mobile device, LXE Login Utility changes the username for the active profile.

Important: The profile must be changed before suspending the unit if the active profile username is to be changed when returning from Suspend.

Select the desired active profile by double tapping on the **Odyssey Client** icon on the Desktop. Select the active profile by changing the selection in the drop-down combo box below the **Connect to:** checkbox.

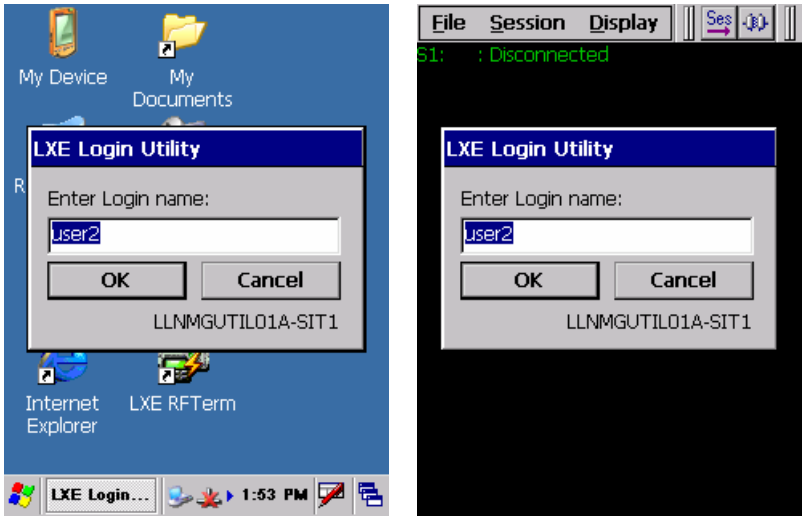


Figure 3-42 LXE Login Utility User Prompt

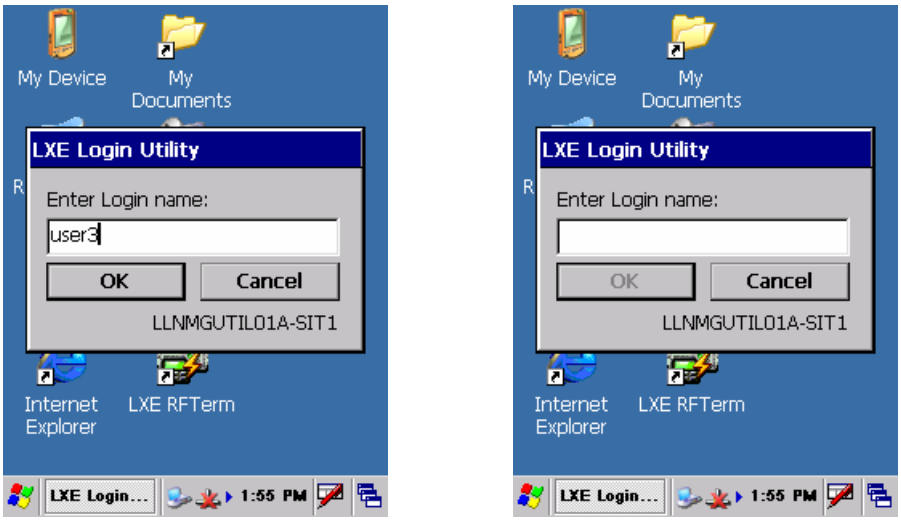
The Login prompt is displayed at system boot and when resuming from suspend. In the second example of the screen shown above, RFTerm has been locked using AppLock and the prompt is displayed on top of the administrator-locked RFTerm.

Note: Focus remains on the login prompt until it is dismissed. Nothing else can be done on the MX7 until the user responds to the prompt.

The currently configured username is displayed and highlighted in the edit control. If the displayed username is desired, press Enter or tap the OK button on the screen.

If the username needs to be changed, start typing the new user name and press Enter or tap the OK button on the screen.

If the LXE Login Utility prompt is closed by pressing Esc or tapping the Cancel button on the screen, the username change is ignored and the previously configured username is used.



User Name Typed User Name Cleared

Figure 3-43 Enter / Select Login Name

If the username is cleared, the OK button is disabled. This prevents the user from accidentally clearing the username before continuing.

After leaving this prompt, by pressing either Enter or Esc (or tapping the OK or Cancel buttons), the Odyssey Client is displayed.

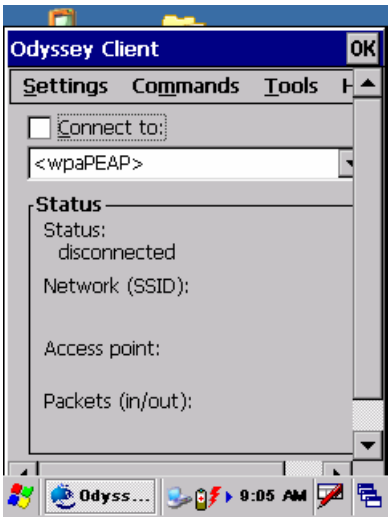


Figure 3-44 Odyssey Client Screen

Press the Spc key or check the **Connect to:** box. The Status changes from **disconnected** to **searching for access point**. After the access point is found, the password prompt is displayed. The <user> shown in the password prompt should match the username typed in the LXE Login Utility.

Figure 3-45 Enter the Odyssey Client Username Password

If the Login name displayed in the Odyssey Client password screen is not correct, cancel the authentication by pressing the **Esc** key or tapping the **Cancel** button on the screen.

When the Odyssey Client password screen is cancelled, the following message is displayed.

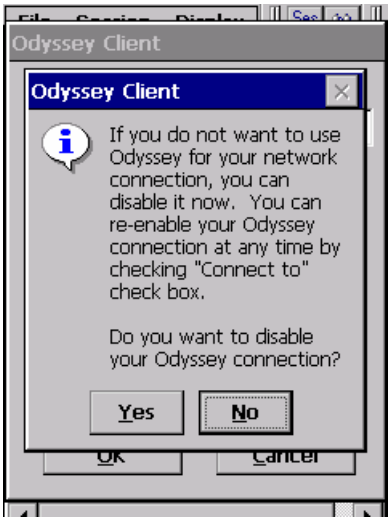

Odyssey Client
Odyssey Client
If you do not want to use Odyssey for your network connection, you can disable it now. You can re-enable your Odyssey connection at any time by checking "Connect to" check box.
Do you want to disable your Odyssey connection?
Yes
No
OK
Cancel

Figure 3-46 Odyssey Client Password Screen Cancelled

Select **Yes** by pressing Enter using the keypad or tapping the **Yes** button on the screen.

Note: Sometimes the password prompt is displayed a second time. If the password prompt is displayed again, repeat the last two steps to cancel the password prompt.

Suspend and resume the MX7 by pressing the power key twice. The LXE Login Utility screen is displayed to the user to enter a new username. Repeat the process described previously in this section to connect.

After correcting the username and starting the connection, enter the password that matches the selected username and press Enter or tap the OK button. The connections are opened.

Sometimes the Odyssey Client is redisplayed with the Status updated. If this happens, press **Enter** to close the Odyssey Client to return to the desktop or last active application.

Uninstall the LXE Login Utility

After the LXE Login Utility has been installed using the instructions in the "Installation" section, it automatically loads anytime a cold or warm reset is performed on the mobile device. To stop the LXE Login Utility from loading, follow the instructions below to uninstall the CAB.

*Note: File extensions must be enabled for viewing for the following procedure to work. To insure extensions are enabled for viewing, double tap **My Device** on the Desktop. Select the **View** menu and the select **Options**. Uncheck **Hide file extensions**.*

1. Double tap **My Device** on the Desktop.
2. Double tap **System**.
3. Use the scroll bar to locate **LXELogin.CAB**.
4. Tap and hold on LXELogin.CAB until the "right mouse-click" menu appears.
5. Select the **Rename** menu item. The stylus cursor changes to the input cursor (I) and **LXELogin.CAB** is highlighted.
6. Press the right arrow key to position the input cursor at the end of the input field.
7. Use the **BkSp** key to erase **CAB** from the filename.
8. Type **LXE** and press the **Enter** key.
9. Warm reset the mobile device by selecting **Run** from the **Start** menu, type **WARMBOOT** in the Open edit control panel and press the **Enter** key.

API Calls

See Also: LXE CE API Programming Guide E-SW-WINAPIPG

The LXE CE API Programming Guide documents only the LXE-specific API calls for the mobile device. It is intended as an addition to the standard Microsoft Windows CE API documentation. Details of many of the calls in the LXE guide may be found in Microsoft's documentation.

The APIs documented in the programming guide are included in LXEAPI.ZIP, which is in the standard Windows CE image on the mobile device.

For ease of software development, the files LXEAPI.H and LXEAPI.LIB are available on the accessories CD, which are the C/C++ include files and the link library for the LXEAPI, respectively. Note that this DLL is installed in mobile device images with a version number of 1.2 or higher (as displayed on the screen during bootup).

A full SDK (on the accessories CD) is now included for Microsoft Embedded Visual C++ 4.0 (which is available free on the Microsoft website).

Clearing Registry Settings

Cold reset puts all registry settings back to LXE factory defaults. No other clearing is available or necessary.

Reflash the Mobile Device

Note: When reflashing, LXE recommends using a SD Flash card that is greater than 64MB. Files to be loaded on the Flash card are: MX7NK.BIN, MX7EBOOT.NB0, MX7.BIT

The MX7 reloads the operating system upon every warm boot or cold boot. Anything not saved or preserved to the registry is lost.

In warm boot, the OS and the CAB files are reloaded from the internal SD card and the preserved registry is also reloaded.

During cold boot, the system behavior is identical to warm boot with the addition that the registry is reloaded with factory defaults.

Preparation

- LXE recommends that installation of the Flash card be performed on a clean, well-lit surface.
- Place the mobile device in Suspend Mode and remove the main battery pack.
- Lift the rubber barrier and pull the SD card out of the slot.
- Locate the <A> key on the 55-key keypad.
- Locate the <Alph> key on the 32-key keypad.

How To

1. Place the SD flash card with new image files on it into the SD slot.
2. Select **Start | Run** and type **Coldboot**.
3. Before the splash screen appears, press and hold down the <A> key on the 55-key keypad. Press and hold down the <Alph> key on the 32-key keypad. Continue to hold the <A> or <Alph> key down until the displays shows “Writing bootloader to flash”.

   Note: If you do not press and hold the key quickly enough, the display shows “Loading system from ATA”. Remove the main battery for 2 seconds, re-insert the battery and press the Power button. Press and hold the <A> or <Alph> key again.

4. The mobile device will automatically reboot after flashing the bootloader. “Loading system from ATA” is displayed on the screen and when the new OS finishes loading, all software upgrades are complete.
5. The touchscreen will need to be re-calibrated.

Once the bootloader is loaded and the files are copied onto the internal Flash drive, you can reflash the bootloader at any time by rebooting the MX7, and holding down the <A> or <Alph> key on the keypad before the splash screen appears.

Wait until the splash screen displays “Writing new bootloader”, and you can release the <A> or <Alph> key.

When reflashing is complete (3-5 seconds), the MX7 will reboot and startup with the new bootloader again.

Chapter 4 AppLock

Introduction

LXE's AppLock is designed to be run on LXE certified Windows CE based devices only. LXE loads the AppLock program as part of the LXE customer installation process.

Configuration parameters are specified by the AppLock Administrator for the mobile device end-user. AppLock is password protected by the Administrator.

End-user mode locks the end-user into the configured application or applications. The end user can still reboot the mobile device and respond to dialog boxes. The administrator-specified application is automatically launched and runs in full screen mode when the device boots up.

When the mobile device is reset to factory default values, for example after a cold reset, the Administrator may need to reconfigure the AppLock parameters.

Sections in this chapter that are not specifically Multi-Application or Single Application are used/changed in the same way by both versions.

Note: LXE has made the assumption, in this chapter, that the first user to power up a new mobile device is the system administrator.

Setup a New Device

LXE devices with the AppLock feature are shipped to boot in Administration mode with no default password, thus when the device is first booted, the user has full access to the device and no password prompt is displayed. After the administrator specifies an application to lock, a password is assigned and the device is rebooted or the hotkey is pressed, the device switches to end-user mode.

Briefly, the process to configure a new device is as follows:

1. Insert a fully charged battery and press the Power button.
2. Connect an external power source to the device (if required).
3. Adjust screen display, audio volume and other parameters if desired. Install accessories (e.g. handstrap, stylus).
4. Tap | **Settings | Control Panel | Administration** icon.
5. Assign an application on the **Control** (single application) or **Application** (multiple application) tab screen.
6. Assign a password on the Security tab screen.
7. Select a view level on the Status tab screen, if desired.
8. Tap OK
9. Press the hotkey sequence to launch AppLock and lock the configured application(s).
10. The device is now in end-user mode.

Note: AppLock cannot support multiple windows of some applications. Attempting to open multiple windows of RFTerm or Pocket Word will cause AppLock to switch to administration mode.

Multi-Application Version

Access: **Start | Settings | Control Panel | Administration icon**

A mobile device running the Multi-Application version of AppLock becomes a dedicated, multiple application device. Only the applications or features specified in the AppLock configuration by the Administrator are available to the user. This version offers a user-mode taskbar icon allowing the user to switch between user applications.

See section titled *Multi-Application Configuration* for information and instruction.

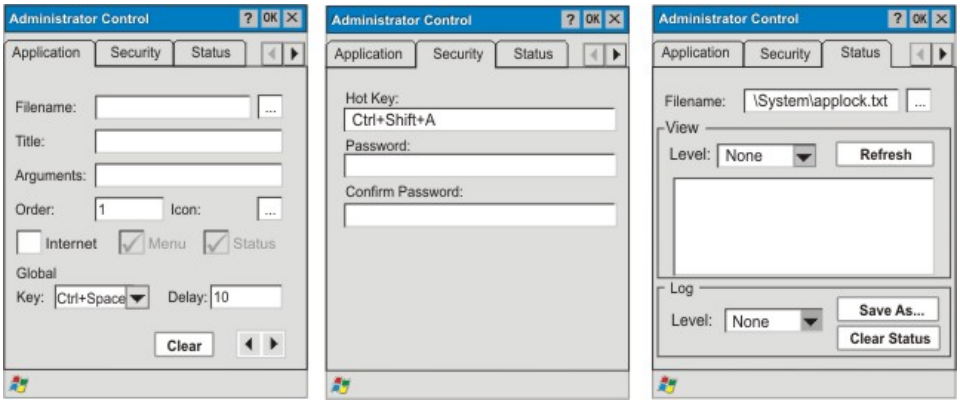


Figure 4-1 Administrator Control Panels – Multi-Application

Single Application Version

Access: **Start | Settings | Control Panel | Administration icon**

A mobile device running the Single Application version of AppLock becomes a dedicated, single application device. In other words, only the application or feature specified in the AppLock configuration by the Administrator is available to the user.

See section titled *Single Application Configuration* for information and instruction.

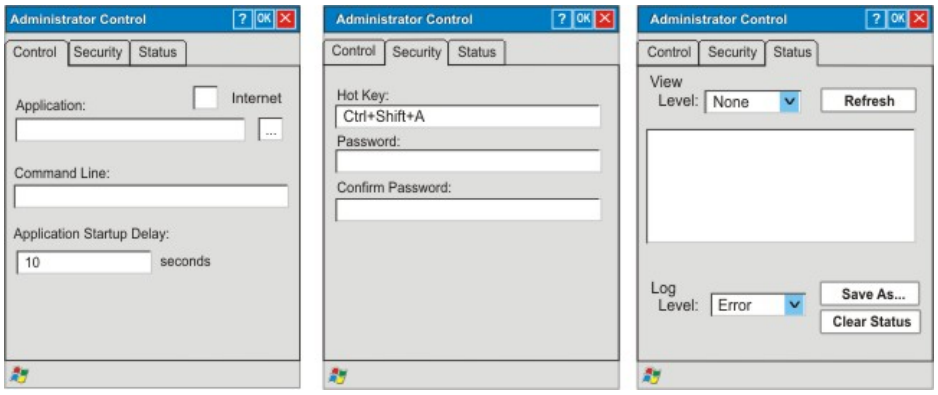


Figure 4-2 Administrator Control Panels – Single Application

Administration Mode

Administration mode gives full access to the mobile device, hardware and software configuration options.

The administrator must enter a valid password (when a password has already been assigned) before access to Administration mode and configuration options are allowed. The administrator can configure the following options:

1. Create/change the keystroke sequence to activate administrator access.
2. Create/change the password for administrator access.
3. Assign the name of the application, or applications, to lock.
4. Select the command line of the application, or applications, to lock.

In addition to these configuration options, the administrator can view and manage the status logs of AppLock sessions.

Administrator default values for this device:

Administrator Hotkey	55-key : Shift+Ctrl+A 32-key : Requires Alpha Mode
Password	none
Application path and name	none
Application command line	none

End User Mode

End-user mode locks the end-user into the configured application (or applications). The end user can still reboot and respond to dialog boxes. Each application is automatically launched, and runs in full screen mode when the device boots up.

The user cannot unintentionally or intentionally exit the application nor can the end user execute any other applications. Normal application exit or switching methods and all Microsoft defined Windows CE key combinations, such as close (X) icon, File Exit, File Close, Alt-F4, Alt-Tab, etc. are disabled. The Windows CE desktop icons, menu bars, task bar and system trays are not visible or accessible. Task Manager is not available.

If the end-user selects File/Exit or Close from the applications menu bar, the menu is cleared and nothing else happens; the application remains active. Nothing happens when the end-user taps on the Close icon on the application's title bar and the application remains active.

Note: A few applications do not follow normal procedures when closing. AppLock cannot prevent this type of application from closing, but is notified that the application has closed. For these applications, AppLock immediately restarts the application which causes the screen to flicker. If this type of application is being locked, the administrator should close all other applications before switching to end user mode to minimize the screen flicker.

Windows accelerator keys such as Alt-F4 are disabled.

Passwords

A password must be configured. If the password is not configured, a new device switches into Administration mode without prompting for a password. In addition to the hotkey press, a mode switch occurs if inaccurate information has been configured or if mandatory information is missing in the configuration.

There are several situations that display a password prompt after a password has been configured.

If the configured hotkey is pressed, the password prompt is displayed. In this case the user has 30 seconds to enter a password. If a valid password is not entered within 30 seconds, the password prompt is dismissed and the device returns to end-user mode.

All other situations that present the password prompt do not dismiss the prompt -- this is because the other situations result in invalid end-user operation.

These conditions include:

1. If inaccurate configuration information is entered by the administrator, i.e. an application is specified that does not exist.
2. If the application name, which is mandatory for end-user mode, is missing in the configuration.
3. Invalid installation of AppLock (e.g. missing DLLs).
4. Corrupted registry settings.

To summarize, if an error occurs that prevents AppLock from switching to user mode, the password will not timeout and AppLock will wait until the correct password is entered.

Troubleshooting

Can’t locate the password that has been set by the administrator? Enter this LXE back door key sequence:

Ctrl+L Ctrl+X Ctrl+E

or

Ctrl+5 Ctrl+9 Ctrl+3

Multi-Application Configuration

The default Administrator Hotkey sequence is **Shift+Ctrl+A.**

Administrator mode allows access to all features on the device. When the hotkey is pressed to switch into Administrator mode, a password prompt is displayed (if a password has been configured). A password must be entered within 30 seconds (and within three tries) or the password prompt is removed and the device remains in end-user mode with the focus returned to the locked application. Without entry of a valid password, the switch into Administrator mode will not occur.

Access: **Start | Settings | Control Panel | Administration icon**

The password prompt is displayed if a password has been configured. When the valid password is entered, the Administration Control panel is displayed. When a valid password is not entered within 30 seconds, the user is returned to the System Control Panel.

If a password has not been configured, the Administrator Control panel is displayed.

Note: AppLock cannot support multiple windows of some applications. Attempting to open multiple windows of RFTerm or Pocket Word will cause AppLock to switch to administration mode.

Application Panel

Figure 4-3 Application Panel – Multi-Application

Note: If your Application Panel does not look like the figure shown above, you may have the Single Application version.

Use the **Application** tab options to select the applications to launch when the device boots up in End User Mode.

Move the cursor to the **Filename** text box and either type the application path or tap the Browse button (the … button). The standard Windows CE Browse dialog is displayed. After selecting the application from the Browse dialog, tap OK.

Enter the **Title** to be associated with the application's icon. The assumption is that multiple copies of the same application may need unique text for the icon in order to differentiate them in the application switcher panel.

Enter the command line parameters for the application in the **Arguments** text box.

Enter the **Order** in which the application is to be loaded or presented to the end user. Applications are launched in lowest to highest number order.

Enable the **Internet** checkbox to use the End User Internet Explorer (EUIE.EXE) When the checkbox is enabled, the Internet **Menu** and Internet **Status** are available. See the section titled *End User Internet Explorer* for more details.

Select the **Global Key** key sequence the end user is to press when switching between applications. The Global Key default key sequence is **Ctrl+Spc**. The Global key is selected from a predefined list of Global hotkey combinations. The Global key is presented to the end-user as the *Activation* key.

Enter the number of seconds in **Global Delay** that both Applications must wait before starting to run upon reboot.

Tap the **Clear** button to clear all Application information that are currently displayed. The Global settings remain the same for both applications.

Use the left and right **scroll buttons** to move from application setup screen to application setup screen. The left and right buttons update the information on the screen with the previous or next configured application respectively.

If no application is specified when the Administrator Control applet is closed, the device reboots into Administrator mode. If a password has been set, but an application has not been specified, the user will be prompted for the password before entering administration mode. The password prompt remains on the display until a valid password is entered.

End User Internet Explorer (EUIE)

AppLock supports applications that utilize Internet Explorer, such as .HTML pages and JAVA applications. The end user can run an application by entering the application name and path in Internet Explorer's address bar.

To prevent the end user from executing an application using this method, the address bar and Options settings dialog are restricted in Internet Explorer. This is accomplished by creating an Internet Explorer that is used in end user mode: End-user Internet Explorer (EUIE.EXE). The EUIE executes the Internet Explorer application in full screen mode which removes the address bar and status bar. The Options Dialog is also removed so the end user cannot re-enable the address bar.

The administrator specifies the EUIE by checking the **Internet** checkbox in the Application tab of the Administrator applet. The internet application should then be entered in the **Application** text box.

When the Internet checkbox is enabled, the **Menu** and **Status** check boxes are available.

Enabling the **Menu** checkbox displays the EUIE menu which contains navigation functions like Back, Forward, Home, Refresh, etc., functions that are familiar to most Internet Explorer users. When the Menu checkbox is blank, the EUIE menu is not displayed and Navigation functions are unavailable.

When the **Status** checkbox is enabled, the status bar displayed by EUIE gives feedback to the end-user when they are navigating the Internet.

If the standard Internet Explorer that is shipped with the mobile device is desired, it should be treated like any other application. This means that IEXPLORER.EXE should be specified in the

Application text box and the internet application should be entered in the command line. In this case, do not check the Internet checkbox.

Security Panel

Figure 4-4 Security Panel – Multi-Application

Hotkey

Specify the hotkey sequence that triggers AppLock to switch between administrator and user modes and the password required to enter Administrator mode. The default hotkey sequence is **Shift+Ctrl+A**.

A 2nd key keypress is an invalid keypress for a hotkey sequence.

Move the cursor to the Hot Key text box. Enter the new hot key sequence by first pressing the Shift state key followed by a normal key. The hotkey selected must be a key sequence that the application being locked does not use. The hotkey sequence is intercepted by AppLock and is not passed to the application.

Input from the keyboard or Input Panel is accepted with the restriction that the normal key must be pressed from the keyboard when switching modes. The hotkey sequence is displayed in the Hot key text box with “Shift”, “Alt”, and “Ctrl” text strings representing the shift state keys. The normal keyboard key completes the hotkey sequence. The hotkey must be entered via the keypad. Some hotkeys cannot be entered via the Input Panel. Also, hotkeys entered via the SIP are not guaranteed to work properly when switching operational modes.

For example, if the ‘Ctrl’ key is pressed followed by ‘A’, “Ctrl+A” is entered in the text box. If another key is pressed after a normal key press, the hotkey sequence is cleared and a new hotkey sequence is started.

A normal key is required for the hotkey sequence and is unlike pressing the normal key during a mode switch; this key can be entered from the SIP when configuring the key. However, when the hotkey is pressed to switch modes, the normal key must be entered from the keypad; it cannot be entered from the SIP.

Password

Move the cursor to the Password text box. The passwords entered in the Password and Confirm Password fields must match. Passwords are case sensitive.

When the user exits the Administrator Control panel, the two passwords are compared to verify that they match. If they do not match, a dialog box is displayed notifying the user of the error. After the user closes the dialog box, the Security Panel is displayed and the password can then be entered and confirmed again. If the passwords match, the password is encrypted and saved.

See Also: *Passwords* and *Troubleshooting Multi-Application AppLock*

Status Panel

Use the Status panel to view the log of previous AppLock operations and to configure which messages are to be recorded during AppLock operation.

Status information is stored in a specific location on the storage device and in a specific log file specified by the Administrator. For this reason, the administrator can configure the type of status information that is logged, as well as clear the status information.

Figure 4-5 Status Panel – Multi-Application

Move the cursor to the **Filename** text box and either type the log file path or tap the Browse button (the … button). The standard Windows CE Browse dialog is displayed. After selecting the log file from the Browse dialog, tap OK.

Note: If your Status Panel does not look like the figure shown above, you may have the Single Application version.

View

Error	Error status messages are logged when an error occurs and is intended to be used by the administrator to determine why the specified application cannot be locked.
Process	Processing status shows the flow control of AppLock components and is mainly intended for LXE Customer Service when helping users troubleshoot problems with their AppLock program.
Extended	Extended status provides more detailed information than that logged by Process Logging.

All All messages are displayed.

Tap the Refresh button after changing from one view level to another. The filtered records are displayed, all others are not displayed.

Log

Note: ***If a level higher than Error is selected, the status should be cleared frequently by the administrator.***

In addition to the three view levels the administrator can select that all status information be logged or turn off all status information logging completely. The system default is 'None'; however to reduce registry use, the administrator may want to select 'None' after verifying the configuration. Tap the Clear button to clear the status information from the registry.

- None
- Error
- Processing
- Extended
- All

Save As

When the 'Save As'… button is selected, a standard 'Save As' dialog screen is displayed. Specify the path and filename. If the filename exists, the user is prompted whether the file should be overwritten. If the file does not exist, it is created.

See Also: *Error Messages*

End-User Switching Technique

Figure 4-6 End-User Multi-Application Touch Panel

Using a Stylus Tap

When the mobile device enters end-user mode, a taskbar icon is available to the user so they can switch between the locked applications. The touch screen must be enabled on the mobile device before the taskbar icon can be used. The taskbar is always visible on top of the application in focus.

When the taskbar icon is tapped, a menu is displayed showing the applications available to the user. The user then taps the application name in the popup menu and the selected application is brought to the foreground. The previous application continues to run in the background. Stylus taps affect the application in focus only.

The appearance of the taskbar is different on various mobile device platforms and may differ from the example shown above. This example is shown only to aid in describing how the user can switch between applications using a stylus. If RFTerm and Microsoft Word were the two applications locked, a switching icon showing both applications is displayed on the screen.

Using a Hotkey Sequence

One hotkey is defined for the end-user to key in when switching between locked applications. This is known as the **Activation** key. The Activation key is assigned by the Administrator using the Global Key parameter. When the hotkey or hotkey sequence is pressed on the keypad, the next application in the AppLock configuration is moved to the foreground and the previous application moves to the background. The previous application continues to run in the background but end-user key presses affect the application in focus only.

Troubleshooting Multi-Application AppLock

The mobile device won't switch from Administration mode to end-user mode.

- If the configuration is valid for one application but not the other, the switch to end-user mode fails. AppLock stays in Administration mode and is stopped until the Administrator password is entered.
- If two copies of the same application are configured, but the application only allows one copy to run at a time, for example Microsoft Pocket Word, the switch to end-user fails. AppLock stays in Administration mode and is stopped until the Administrator password is entered.

The hotkey sequence needed is not allowed. What does this mean?

When the Administrator is selecting a hotkey sequence to use when switching user modes, they are not allowed to enter key combinations that are reserved by installed software applications. LXE has validated RFTerm key combinations ONLY.

When RFTerm is installed on the mobile device and an RFTerm restricted key sequence is specified as a hotkey sequence by the Administrator, the following error message is displayed in a message box:

Selected hotkey is not allowed. Please reenter.

When RFTerm is not installed on the mobile device, the RFTerm keys are not restricted from use.

Single Application Configuration

The default Administrator Hotkey sequence is **Shift+Ctrl+A.**

Administrator mode allows access to all features on the device. When the hotkey is pressed to switch into Administrator mode, a password prompt is displayed (if a password has been configured). A password must be entered within 30 seconds (and within three tries) or the password prompt is removed and the device remains in end-user mode with the focus returned to the locked application. Without entry of a valid password, the switch into Administrator mode will not occur.

Access: **Start | Settings | Control Panel | Administration icon**

The password prompt is displayed if a password has been configured. When the valid password is entered, the Administration Control panel is displayed. When a valid password is not entered within 30 seconds, the user is returned to the System Control Panel.

If a password has not been configured, the Administrator Control panel is displayed.

Control Panel

Figure 4-7 Control Panel

Note: If your Administrator Control Panel does not look like the figure shown above, you may have the Multi-Application version.

Use the Control tab options to select the application to launch when the device boots up.

Move the cursor to the Application text box and either type the application path or tap the Browse button (the … button). The standard Windows CE Browse dialog is displayed. After selecting the application from the Browse dialog, tap OK.

Enter the command line parameters for the application in the Command Line text box.

Enter the number of seconds the selected Application must wait before starting to run upon reboot.

If no application is specified when the Administrator Control panel is closed, the device reboots into Administrator mode. If a password has been set, but the application has not been specified,

the user will be prompted for the password before entering administration mode. The password prompt remains on the display until a valid password is entered.

End User Internet Explorer

AppLock supports applications that utilize Internet Explorer, such as .HTML pages and JAVA applications. The end user can run an application by entering the application name and path in Internet Explorer's address bar.

To prevent the end user from executing an application using this method, the address bar and Options settings dialog are restricted in Internet Explorer. This is accomplished by creating an Internet Explorer that is used in end user mode, End-user Internet Explorer (EUIE). The EUIE executes the Internet Explorer application in full screen mode which removes the address bar and status bar. The Options Dialog is also removed so the end user cannot re-enable the address bar.

The administrator specifies the EUIE by simply checking the "Internet" checkbox in the Control tab of the Administrator applet. The internet application should then be entered in the "Application" text box. If the standard Internet Explorer that is shipped with the device is desired, it should be treated like any other application. This means that IEXPLORER.EXE should be specified in the Application text box and the internet application should be entered in the command line. In this case, do not check the Internet checkbox.

Security Panel

Figure 4-8 Security Panel

Hotkey

Specify the hotkey sequence that triggers AppLock to switch between administrator and user modes and the password required to enter Administrator mode. The default hotkey sequence is **Shift+Ctrl+A**.

A 2nd key keypress is an invalid keypress for a hotkey sequence.

Move the cursor to the Hot Key text box. Enter the new hot key sequence by first pressing the Shift state key followed by a normal key. The hotkey selected must be a key sequence that the application being locked does not use. The hotkey sequence is intercepted by AppLock and is not passed to the application.

Input from the keyboard or Input Panel is accepted with the restriction that the normal key must be pressed from the keyboard when switching modes. The hotkey sequence is displayed in the Hot key text box with “Shift”, “Alt”, and “Ctrl” text strings representing the shift state keys. The normal keyboard key completes the hotkey sequence. The hotkey must be entered via the keypad. Some hotkeys cannot be entered via the Input Panel. Also, hotkeys entered via the SIP are not guaranteed to work properly when switching operational modes.

For example, if the ‘Ctrl’ key is pressed followed by ‘A’, “Ctrl+A” is entered in the text box. If another key is pressed after a normal key press, the hotkey sequence is cleared and a new hotkey sequence is started.

A normal key is required for the hotkey sequence and is unlike pressing the normal key during a mode switch; this key can be entered from the SIP when configuring the key. However, when the hotkey is pressed to switch modes, the normal key must be entered from the keypad; it cannot be entered from the SIP.

Password

Move the cursor to the Password text box. The passwords entered in the Password and Confirm Password fields must match. Passwords are case sensitive.

When the user exits the Administrator Control panel, the two passwords are compared to verify that they match. If they do not match, a dialog box is displayed notifying the user of the error. After the user closes the dialog box, the Security Panel is displayed and the password can then be entered and confirmed again. If the passwords match, the password is encrypted and saved.

See Also: Passwords

Status Panel

Figure 4-9 Status Panel

Note: If your Status Panel does not look like the figure shown above, you may have the Multi-Application version.

Use the Status panel to view the log of previous AppLock operation and to configure which messages are to be recorded during AppLock operation.

As the status information is stored in the registry and accumulates during AppLock configuration and operation, it is very important that the administrator periodically clear the status information

to reduce the amount of registry space used. For this reason, the administrator can configure the type of status information that is logged, as well as clear the status information.

View

Error	Error status messages are logged when an error occurs and is intended to be used by the administrator to determine why the specified application cannot be locked.
Process	Processing status shows the flow control of AppLock components and is mainly intended for LXE Customer Service when helping users troubleshoot problems with their AppLock program.
Extended	Extended status provides more detailed information than that logged by Process Logging.
All	All messages are displayed.

Tap the Refresh button after changing from one view level to another. The filtered records are displayed, all others are not displayed.

Levels

Note: ***If a level higher than Error is selected, the status should be cleared frequently by the administrator.***

In addition to the three view levels the administrator can select that all status information be logged or turn off all status information logging completely. The system default is 'None'; however to reduce registry use, the administrator may want to select 'None' after verifying the configuration. Tap the Clear button to clear the status information from the registry.

- None
- Error
- Processing
- Extended
- All

Save As

When the 'Save As'… button is selected, a standard 'Save As' dialog screen is displayed. Specify the path and filename. If the filename exists, the user is prompted whether the file should be overwritten. If the file does not exist, it is created.

See Also: Error Messages

AppLock Error Messages

Any messages whose first word is an 'ing' word is output prior to the action described in the message. For example, "Switching to admin-hotkey press" is logged after the administrator has pressed the hotkey but prior to starting the switch process.

For all operations that can result in an error, an Error level message is displayed when a failure occurs. These messages contain the word "failure". These messages have a partner Extended level message that is logged which contains the word "OK" if the action completed successfully rather than with an error.

For processing level messages, "Enter…" is logged at the beginning of the function specified in the message and "Exit…" is logged at the end (just before the return) of the function specified in the message.

Message	Explanation and/or corrective action	Level
Error reading hotkey	The hotkey is read but not required by AppLock.	LOG_EX
Error reading hotkey; using default	A hotkey is required. If there is a failure reading the hotkey, the internal factory default is used.	LOG_ERROR
App Command Line= <Command line>	Command line of the application being locked	LOG_PROCESSING
App= <Application name>	Name of the application being locked	LOG_PROCESSING
dwProcessID= <#>	Device ID of the application being locked	LOG_EX
Encrypt exported key len <#>	Size of encrypt export key	LOG_EX
Encrypt password length= <#>	The length of the encrypted password.	LOG_EX
Encrypted data len <#>	Length of the encrypted password	LOG_EX
hProcess= <#>	Handle of the application being locked	LOG_EX
Key pressed = <#>	A key has been pressed and trapped by the hotkey processing.	LOG_EX
**********	The status information is being saved to a file and the file has been opened successfully.	LOG_EX
Address of keyboard hook procedure failure	AppLock found the kbdhook.dll, but was unable to get the address of the initialization procedure. For some reason the dll is corrupted. Look in the \Windows directory for kbdhook.dll. If it exists, delete it. Also delete AppLock.exe from the \Windows directory and reboot the unit. Deleting AppLock.exe triggers the AppLock system to reload.	LOG_ERROR
Address of keyboard hook procedure OK	AppLock successfully retrieved the address of the keyboard filter initialization procedure.	LOG_EX
Alt pressed	The Alt key has been pressed and trapped by the HotKey processing.	LOG_EX

Message	Explanation and/or corrective action	Level
Alt	Processing the hotkey and backdoor entry	LOG_EX
Application handle search failure	The application being locked did not complete initialization.	LOG_ERROR
Application handle search OK	The application initialized itself successfully	LOG_ERROR
Application load failure	The application could not be launched by AppLock; the application could not be found or is corrupted.	LOG_ERROR
Backdoor message received	The backdoor keys have been pressed. The backdoor hotkeys provide a method for customer service to get a user back into their system without editing the registry or reloading the device.	LOG_PROCESSING
Cannot find kbdhook.dll	The load of the keyboard filter failed. This occurs when the dll is missing or is corrupted. Look in the \Windows directory for kbdhook.dll. If it exists, delete it. Also delete AppLock.exe from the \Windows directory and reboot the unit. Deleting AppLock.exe triggers the AppLock system to reload.	LOG_ERROR
Converted Pwd	Converted password from wide to mbs.	LOG_EX
Could not create event EVT_HOTKEYCHG	The keyboard filter uses this event at the Administrator Control panel. The event could not be created.	LOG_ERROR
Could not hook keyboard	If the keyboard cannot be controlled, AppLock cannot process the hotkey. This failure prevents a mode switch into user mode.	LOG_ERROR
Could not start thread HotKeyMon	The keyboard filter must watch for hot key changes. The watch process could not be initiated.	LOG_ERROR
Ctrl after L or X	Processing the backdoor entry.	LOG_EX
Ctrl pressed	The Ctrl key has been pressed and trapped by the HotKey processing.	LOG_EX
Ctrl	Processing the hotkey and backdoor entry.	LOG_EX
Decrypt acquire context failure	Unable to decrypt password.	LOG_ERROR
Decrypt acquired context OK	Decryption process ok.	LOG_EX
Decrypt create hash failure	Unable to decrypt password.	LOG_ERROR
Decrypt created hash OK	Decryption process ok.	LOG_EX
Decrypt failure	Unable to decrypt password.	LOG_ERROR
Decrypt import key failure	Unable to decrypt password.	LOG_ERROR
Decrypt imported key OK	Decryption process ok.	LOG_EX

Message	Explanation and/or corrective action	Level
Encrypt acquire context failure	Unable to encrypt password.	LOG_ERROR
Encrypt acquire encrypt context failure	Unable to encrypt password.	LOG_ERROR
Encrypt acquired encrypt context OK	Encrypt password process successful.	LOG_EX
Encrypt create hash failure	Unable to encrypt password.	LOG_ERROR
Encrypt create key failure	Unable to encrypt password.	LOG_ERROR
Encrypt created encrypt hash OK	Encrypt password process successful.	LOG_EX
Encrypt export key failure	Unable to encrypt password.	LOG_ERROR
Encrypt export key length failure	Unable to encrypt password.	LOG_ERROR
Encrypt exported key OK	Encrypt password process successful.	LOG_EX
Encrypt failure	The password encryption failed.	LOG_ERROR
Encrypt gen key failure	Unable to encrypt password.	LOG_ERROR
Encrypt generate key failure	Unable to encrypt password.	LOG_ERROR
Encrypt get user key failure	Unable to encrypt password.	LOG_ERROR
Encrypt get user key ok	Encrypt password process successful.	LOG_EX
Encrypt hash data failure	Unable to encrypt password.	LOG_ERROR
Encrypt hash data from pwd OK	Encrypt password process successful.	LOG_EX
Encrypt length failure	Unable to encrypt password.	LOG_ERROR
Encrypt out of memory for key	Unable to encrypt password.	LOG_ERROR
Encrypted data OK	The password has been successfully encrypted.	LOG_EX
Enter AppLockEnumWindows	In order for AppLock to control the application being locked so it can prevent the application from exiting, AppLock launches the application and has to wait until it has created and initialized its main window. This message is logged when the function that waits for the application initialization is entered.	LOG_EX
Enter DecryptPwd	Entering the password decryption process.	LOG_PROCESSING
Enter EncryptPwd	Entering the password encryption processing.	LOG_PROCESSING
Enter FullScreenMode	Entering the function that switches the screen mode. In full screen mode, the taskbar is hidden and disabled.	LOG_PROCESSING

Message	Explanation and/or corrective action	Level
Enter GetAppInfo	Processing is at the beginning of the function that retrieves the application information from the registry.	LOG_PROCESSING
Enter password dialog	Entering the password dialog processing.	LOG_PROCESSING
Enter password timeout	Entering the password timeout processing.	LOG_PROCESSING
Enter restart app timer	Some application shut down before AppLock can stop it. In these cases, AppLock gets notification of the exit. When the notification is received, AppLock starts a timer to restart the application. This message logs that the timer has expired and the processing is at the beginning of the timer function.	LOG_PROCESSING
Enter TaskbarScreenMode	Entering the function that switches the screen to non-full screen mode and enable the taskbar.	LOG_PROCESSING
Enter ToAdmin	Entering the function that handles a mode switch into admin mode.	LOG_PROCESSING
Enter ToUser	Entering the function that handles the mode switch to user mode	LOG_PROCESSING
Enter verify password	Entering the password verification processing.	LOG_PROCESSING
Exit AppLockEnumWindows-Found	There are two exit paths from the enumeration function. This message denotes the enumeration function found the application.	LOG_PROCESSING
Exit AppLockEnumWindows-Not found	There are two exit paths from the enumeration function. This message denotes the enumeration function did not find the application.	LOG_PROCESSING
Exit DecryptPwd	Exiting password decryption processing.	LOG_PROCESSING
Exit EncryptPwd	Exiting password encryption processing.	LOG_PROCESSING
Exit FullScreenMode	Exiting the function that switches the screen to full screen.	LOG_PROCESSING
Exit GetAppInfo	Processing is at the end of the function that retrieved the application information from the registry.	LOG_PROCESSING
Exit password dialog	Exiting password prompt processing.	LOG_PROCESSING
Exit password dialog-cancel	Exiting password prompt w/cancel.	LOG_PROCESSING
Exit password dialog-OK	Exiting password prompt successfully.	LOG_PROCESSING
Exit password timeout	Exiting password timeout processing.	LOG_PROCESSING
Exit restart app timer	Processing is at the end of the timer function	LOG_PROCESSING
Exit TaskbarScreenMode	Exiting the function that switches the screen mode back to normal operation for the administrator.	LOG_PROCESSING

Message	Explanation and/or corrective action	Level
Exit ToAdmin	Exiting the function that handles the mode switch into admin mode.	LOG_PROCESSING
Exit ToUser	Exiting the user mode switch function.	LOG_PROCESSING
Exit ToUser-Registry read failure	The AppName value does not exist in the registry so user mode cannot be entered.	LOG_PROCESSING
Exit verify password-no pwd set	Exiting password verification.	LOG_PROCESSING
Exit verify password-response from dialog	Exiting password verification.	LOG_PROCESSING
Found taskbar	The handle to the taskbar has been found so that AppLock can disable it in user mode.	LOG_PROCESSING
Getting address of keyboard hook init procedure	AppLock is retrieving the address of the keyboard hook.	LOG_PROCESSING
Getting configuration from registry	The AppLock configuration is being read from the registry. This occurs at initialization and also at entry into user mode. The registry must be re-read at entry into user mode in case the administration changed the settings of the application being controlled.	LOG_PROCESSING
Getting encrypt pwd length	The length of the encrypted password is being calculated.	LOG_EX
Hook wndproc failure	AppLock is unable to lock the application. This could happen if the application being locked encountered an error after performing its initialization and shut itself down prior to being locked by AppLock.	LOG_ERROR
Hook wndproc of open app failure	The application is open, but AppLock cannot lock it.	LOG_ERROR
Hot key event creation failure	The Admin applet is unable to create the hotkey notification.	LOG_ERROR
Hot key pressed	Processing the hotkey and backdoor entry	LOG_EX
Hot key pressed	Processing the hotkey and backdoor entry	LOG_EX
Hot key set event failure	When the administrator changes the hotkey configuration the hotkey controller must be notified. This notification failed.	LOG_ERROR
Hotkey press message received	The user just pressed the configured hotkey.	LOG_PROCESSING
In app hook:WM_SIZE	In addition to preventing the locked application from exiting, AppLock must also prevent the application from enabling the taskbar and resizing the application's window. This message traps a change in the window size and corrects it.	LOG_EX

Message	Explanation and/or corrective action	Level
In app hook:WM_WINDOWPOSCHANGED	In addition to preventing the locked application from exiting, AppLock must also prevent the application from enabling the taskbar and resizing the application's window. This message traps a change in the window position and corrects it.	LOG_EX
Initializing keyboard hook procedure	AppLock is calling the keyboard hook initialization.	LOG_PROCESSING
Keyboard hook initialization failure	The keyboard filter initialization failed.	LOG_ERROR
Keyboard hook loaded OK	The keyboard hook dll exists and loaded successfully.	LOG_EX
L after Ctrl	Processing the backdoor entry.	LOG_EX
Loading keyboard hook	When AppLock first loads, it loads a dll that contains the keyboard hook processing. This message is logged prior to the load attempt.	LOG_PROCESSING
Open failure	The status information is being saved to a file and the file open has failed. This could occur if the file is write protected. If the file does not exist, it is created.	LOG_ERROR
Open registry failure	If the Administration registry key does not exist, the switch to user mode fails because the AppName value in the Administration key is not available.	LOG_ERROR
Opened status file	The status information is being saved to a file and the file has been opened successfully.	LOG_EX
Out of memory for encrypted pwd	Not enough memory to encrypt the password.	LOG_ERROR
pRealTaskbarWndProc already set	The taskbar control has already been installed.	LOG_EX
Pwd cancelled or invalid-remain in user mode	The password prompt was cancelled by the user or the maximum number of failed attempts to enter a password was exceeded.	LOG_EX
Read registry error-hot key	The hotkey registry entry is missing or empty. This is not considered an error. The keyboard hook uses an embedded default if the value is not set in the registry.	LOG_ERROR
Read registry failure-app name	AppName registry value does not exist or is empty. This constitutes a failure for switching into user mode.	LOG_ERROR
Read registry failure-Cmd Line	AppCommandLine registry entry is missing or empty. This is not considered an error since command line information is not necessary to launch and lock the application.	LOG_ERROR
Read registry failure-Internet	The Internet registry entry is missing or empty. This is not considered an error since the Internet value is not necessary to launch and lock the application.	LOG_ERROR

Message	Explanation and/or corrective action	Level
Registering Backdoor MSG	The AppLock system communicates with the keyboard hook via a user defined message. Both AppLock.exe and Kbdhook.dll register the message at initialization.	LOG_PROCESSING
Registering Hotkey MSG	The AppLock system communicates with the keyboard hook via a user defined message. Both Applock.exe and Kbdhook.dll register the message at initialization.	LOG_PROCESSING
Registry read failure at reenter user mode	The registry has to be read when entering user mode is the AppName is missing. This user mode entry is attempted at boot and after a hotkey switch when the administrator has closed the application being locked or has changed the application name or command line.	LOG_ERROR
Registry read failure at reenter user mode	The registry has to be read when switching into user mode. This is because the administrator can change the settings during administration mode. The read of the registry failed which means the Administration key was not found or the AppName value was missing or empty.	LOG_ERROR
Registry read failure	The registry read failed. The registry information read when this message is logged is the application information. It the Administration key cannot be opened or if the AppName value is missing or empty, this error is logged. The other application information is not required. If the AppName value is not available, AppLock cannot switch into user mode.	LOG_ERROR
Reset system work area failure	The system work area is adjusted when in user mode to cover the taskbar area. The system work area has to be adjusted to exclude the taskbar area in administration mode. AppLock was unable to adjust this area.	LOG_ERROR
Shift pressed	The Shift key has been pressed and trapped by the HotKey processing.	LOG_EX
Shift	Processing the hotkey and backdoor entry	LOG_EX
Show taskbar	The taskbar is now being made visible and enabled.	LOG_PROCESSING
Switching to admin-backdoor	The system is currently in user mode and is now switching to admin mode. The switch occurred because of the backdoor key presses were entered by the administrator.	LOG_PROCESSING
Switching to admin-hotkey press	The system is currently in user mode and is now switching to admin mode. The switch occurred because of a hotkey press by the administrator.	LOG_PROCESSING
Switching to admin-kbdhook.dll not found	The keyboard hook load failed, so AppLock switches to admin mode. If a password is specified, the password prompt is displayed and remains until a valid password is entered.	LOG_PROCESSING

Message	Explanation and/or corrective action	Level
Switching to admin-keyboard hook initialization failure	If the keyboard hook initialization fails, AppLock switches to admin mode. . If a password is specified, the password prompt is displayed and remains until a valid password is entered.	LOG_PROCESSING
Switching to admin-registry read failure	See the explanation of the “Registry read failure” above. AppLock is switching into Admin mode. If a password has been configured, the prompt will be displayed and will not be dismissed until a valid password is entered.	LOG_PROCESSING
Switching to TaskbarScreenMode	In administration mode, the taskbar is visible and enabled.	LOG_EX
Switching to user mode	The registry was successfully read and AppLock is starting the process to switch to user mode.	LOG_PROCESSING
Switching to user-hotkey press	The system is currently in admin mode and is now switching to user mode. The switch occurred because of a hotkey press by the administrator.	LOG_PROCESSING
Taskbar hook failure	AppLock is unable to control the taskbar to prevent the locked application from re-enabling it.	LOG_ERROR
Taskbar hook OK	AppLock successfully installed control of the taskbar.	LOG_EX
Timeout looking for app window	After the application is launched, AppLock must wait until the application has initialized itself before proceeding. The application did not start successfully and AppLock has timed out.	LOG_ERROR
ToUser after admin, not at boot	The user mode switch is attempted when the device boots and after the administrator presses the hotkey. The mode switch is being attempted after a hotkey press.	LOG_EX
ToUser after admin-app still open	The switch to user mode is being made via a hotkey press and the administrator has left the application open and has not made any changes in the configuration.	LOG_EX
ToUser after admin-no app or cmd line change	If user mode is being entered via a hotkey press, the administrator may have left the configured application open. If so, AppLock does not launch the application again unless a new application or command line has been specified; otherwise, it just locks it.	LOG_EX
Unable to move desktop	The desktop is moved when switching into user mode. This prevents them from being visible if the application is exited and restarted by the timer. This error does not affect the screen mode switch; processing continues.	LOG_ERROR
Unable to move taskbar	The taskbar is moved when switching into user mode. This prevents them from being visible if the application is exited and restarted by the timer. This error does not affect the screen mode switch; processing continues.	LOG_ERROR

Message	Explanation and/or corrective action	Level
Unhook taskbar wndproc failure	AppLock could not remove its control of the taskbar. This error does not affect AppLock processing	LOG_ERROR
Unhook wndproc failure	AppLock could not remove the hook that allows monitoring of the application.	LOG_ERROR
Unhooking taskbar	In administration mode, the taskbar should return to normal operation, so AppLock's control of the taskbar should be removed.	LOG_EX
Unhooking wndproc	When the administrator leaves user mode, the device is fully operational; therefore, AppLock must stop monitoring the locked application.	LOG_EX
WM_SIZE adjusted	This message denotes that AppLock has readjusted the window size.	LOG_EX
X after Ctrl+L	Processing the backdoor entry.	LOG_EX
Ret from password <#>	Return value from password dialog.	LOG_EX
Decrypt data len <#>	Length of decrypted password.	LOG_EX
Window handle to enumwindows=%x	The window handle that is passed to the enumeration function. This message can be used by engineering with other development tools to trouble shoot application lock failures.	LOG_EX
WM_WINDOWPOSCHG adjusted=%x	Output the window size after it has been adjusted by AppLock	LOG_EX

AppLock Registry Settings

This system application runs at startup via the "launch" feature of LXE Windows CE devices. When the launch feature is installed on the device, the following registry settings are created. The launch feature registry settings are embedded in the mobile device OS image:

```
HKEY_LOCAL_MACHINE\\Software\\LXE\\Persist\\Filename=AppLock.exe
HKEY_LOCAL_MACHINE\\Software\\LXE\\Persist\\Installed=
HKEY_LOCAL_MACHINE\\Software\\LXE\\Persist\\FileCheck=
```

AppLock registry settings identify the application that is going to be locked and any parameters that are needed by the application. These registry settings are as follows:

```
HKEY_LOCAL_MACHINE\\Software\\LXE\\Administration\\AppName
HKEY_LOCAL_MACHINE\\Software\\LXE\\AppCommandLine=
```

In addition to the registry settings needed to specify the application, additional registry settings are needed to store the configuration options for AppLock. These options include, among others, the administrator's password and hotkey.

```
HKEY_LOCAL_MACHINE\\Software\\LXE\\AppLock\\Administration\\HotKey=
HKEY_LOCAL_MACHINE\\Software\\LXE\\AppLock\\Administration\\EP=
```

Chapter 5 Wireless Network Configuration

Introduction

The MX7 mobile device uses the LXE 802.11b/g radio and either the Funk® Odyssey Client software on the mobile device or the Summit Client software. Both client software utilities support WEP, WPA, no authentication and all authentications listed below.

The Odyssey Client radio is an 802.11b/g radio, capable of both 802.11b and 802.11g data rates.

The Summit Client radio is an 802.11g radio, capable of both 802.11b and 802.11g data rates.

This chapter is separated into two sections: Funk Odyssey Client Configuration and Summit Client Configuration. Please refer to the table below for the security options supported by each client.

Security Options Supported	Radio	
	Summit Client	Odyssey Client
None	Yes	Yes
WEP	Yes	Yes
LEAP	Yes	Yes
WPA-PSK	Yes	Yes
WPA/LEAP	Yes	Yes
PEAP-MSCHAP	Yes	Yes
PEAP-GTC	No	Yes
EAP-TLS	No	Yes

Prerequisites

- Network SSID or ESSID number of the Access Point
- WEP or LEAP Authentication Protocol Keys
- The Summit profile settings for *Auth Type*, *EAP Type* and *Encryption* depend on the security option chosen.

	Please refer to the "LXE Security Primer" to prepare the Authentication Server and Access Point for MX7 communication.

	It is important that all dates are correct on CE computers when using any type of certificate. Certificates are date sensitive and if the date is not correct authentication will fail.

Summit Client Configuration

Summit Client Utility Icon

Start the Summit Client configuration by tapping the Summit Client Utility icon on the desktop. You can also start the Summit Client utility by tapping **Start | Programs | Summit | SCU**.

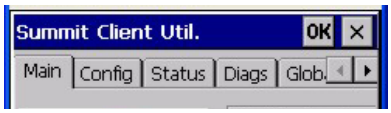
Wireless Zero Config

- The WZC utility has an icon in the toolbar that looks like networked computers with a red X through them, indicating that Wireless Zero Config application is enabled at this time and the MX7 is not connected to a network. *LXE does not recommend use of the Wireless Zero Configuration Utility for configuring the radio as it cannot be used to configure all supported security protocols.*
- You can use either the Wireless Zero Configuration Utility or the Summit Client Utility to connect to your network.

See "Wireless Zero Config Utility" at the end of this chapter when using Wireless Zero Config.

Important: Perform a Warm Reset (after adding a new profile or changing parameters of an existing profile) to save the changed parameters in the registry.

Summit Client Utility



The **Main** tab provides information, admin login and active config (profile) selection.

Profile specific parameters are found on the **Config** tab. The parameters on this tab can be set to unique values for each profile.

The **Status** tab contains information on the current connection.

The **Diags** tab provides utilities to troubleshoot the radio.

Global parameters are found on the **Global Settings** tab. The values for these parameters apply to all profiles.

Main

Factory Default Settings	
Main	
Admin Login	SUMMIT
Radio	Enabled
Active Config	Default

Figure 5-1 Summit Client Utility – Main tab

The Main tab displays information about the radio including:

- SCU (Summit Client Utility) version
- Driver version
- Regulatory Domain
- Copyright Info
- Active Config profile
- Status of the radio (Down, Associated, etc).

The **Active Config** (profile) can be switched without logging in to Administrator mode.

When the profile named "ThirdPartyConfig" is chosen as the active profile, the Summit Client Utility passes control to Windows Zero Config for configuration of all radio and security settings for the radio module. See "Wireless Zero Config Utility" later in this chapter for Wireless Zero Config instruction.

The **Disable Radio** button can be used to disable the radio card. Once disabled, the button label changes to Enable Radio.

The **Admin Login** button provides access to editing radio parameters. Config and Global Settings may only be edited after entering the Admin Login password. The password is case-sensitive. Once logged in, the button label changes to Admin Logout. To logout, either tap the Admin Logout button or exit the SCU without tapping the Admin Logout button.

Administrator Mode

To login to Admin mode, tap the **Admin Login** button.

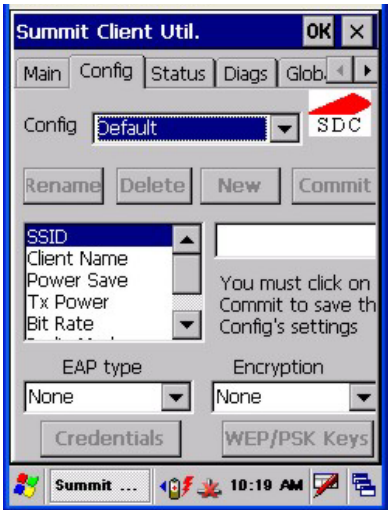
Figure 5-2 Main tab – Enter Admin Password

Enter the Admin password (the default password is SUMMIT and is case sensitive) and tap OK. If the password is incorrect an error message is displayed.

The Admin default password can be changed on the Global Settings tab.

Config

*Note: Tap the **Commit** button to save changes. If the panel is exited before tapping the Commit button, changes are not saved!*



Factory Default Settings	
Config Panel	
Config	Default
SSID	Blank
Client Name	Blank
Power Save	CAM
Tx Power	Maximum
Bit Rate	Auto
Radio Mode	B+G rates
Auth Type	Open
EAP type	None
Encryption	None

Figure 5-3 Summit Client Utility – Config tab

When logged in as Administrator (see "Administrator Mode"), use the Config tab to manage profiles.

Buttons

Button	Function
Rename	Assigns a new, unique name. If the new name is not unique, an error message is displayed and the profile is not renamed.
Delete	Deletes the profile. The current active profile cannot be deleted and an error message is displayed if a delete is attempted.
New	Creates a new profile with the default settings (see "Config Parameters") and prompts for a unique name. If the name is not unique, an error message is displayed and the new profile is not created.
Commit	Saves the profile settings made on this screen. Settings are saved in the profile.
Credentials	Allows entry of a username and password, certificate names, and other information required to authenticate with the access point. The information required depends on the EAP type.
WEP/PSK Keys	Allows entry of WEP keys or pass phrase as required by the type of encryption.

Important – The settings for *Auth Type*, *EAP Type* and *Encryption* depend on the security type chosen. Please refer to "Wireless Security" later in this Summit Client Utility section to determine the proper settings for the security type implemented on the wireless LAN.

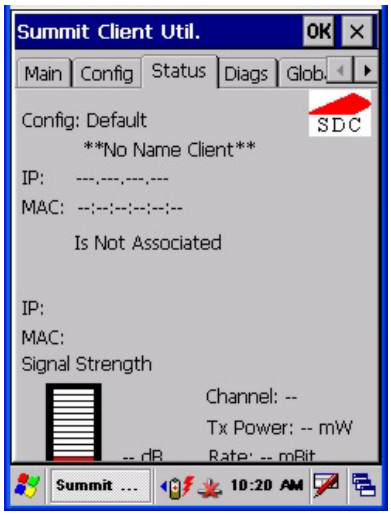
Config Parameters

Parameter	Default	Explanation
Config	Default	A string of 1 to 32 alphanumeric characters, establishes the name of the Config or Profile. Options are Default or ThirdPartyConfig.
SSID	Blank	A string of up to 32 alphanumeric characters. Establishes the Service Set Identifier (SSID) of the WLAN to which the radio connects.
Client Name	Blank	A string of up to 16 characters. The client name is assigned to the radio and the device using the radio. The client name may be passed to networking radio devices, e.g. Access Points.
Power Save	CAM	Power save mode is Off. The radio is in Contantly Awake Mode (CAM).
Tx Power	Maximum	Maximum setting regulates Tx power to the Max power setting for the current regulatory domain. Options are: Maximum, 50mW, 30mW, 10mW or 1mW.
Bit Rate	Auto	Setting the rate to Auto will allow the Access Point to automatically negotiate the bit rate with the compact flash radio. Options are: Auto, 1 Mbit, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48 or 54 Mbit.

Parameter	Default	Explanation
Radio Mode	B+G rates	Specify 802.11g and/or 802.11b when communicating with the Access Point. Options are: B rates only or B+G rates.
Auth Type	Open	802.11 authentication type used when associating with the Access Point. Options are: Open, LEAP, or Shared key.
EAP Type	None	Extensible Authentication Protocol (EAP) type used for 802.1x authentication to the Access Point. Options are: None, LEAP, EAP-FAST, PEAP-MSCHAP, PEAP-GTC, or EAP-TLS.
Encryption	None	Type of encryption to be used to protect transmitted data. Options are: None, Manual WEP, Auto WEP, WPA PSK, WPA TKIP, WPA2 PSK, WPA2 TKIP, WPA2 AES, CCKM TKIP, or CCKM AES.

Status

This screen displays information on the current profile and radio connection. Information cannot be edited or changed on the Status panel.



The panel displays:

- Config profile being used.
- The client name, IP address and MAC address.
- The status of the radio (down, associated, authenticated, etc.).
- The name, IP address and MAC address of the Access Point maintaining the connection to the network.
- Signal strength (changes with network activity)
- Channel currently being used for wireless traffic.
- Current transmit power in mW.
- Bit rate in mBit.

Figure 5-4 Summit Client Utility – Status tab

Diags

The Diags panel can be used for troubleshooting network traffic and radio connectivity issues. It can also be used to update the radio driver on the MX7. Administrator login is required for the (Re)connect button function. *Diagnostics, Update Driver and Site Survey functions are not available in this release.*

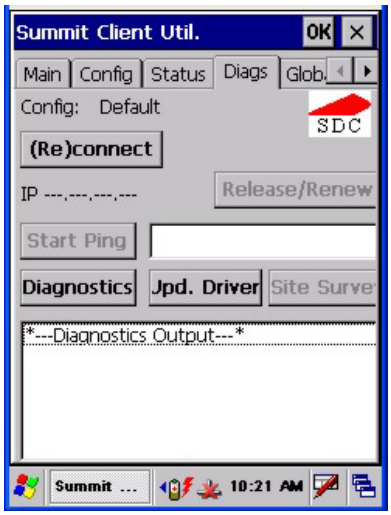


Figure 5-5 Summit Client Utility – Diags tab

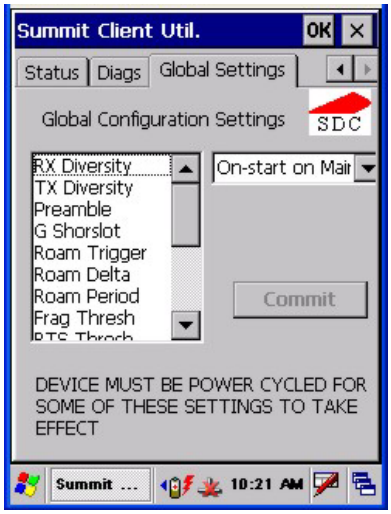
Buttons

Button	Function
(Re)connect	Tap this button to apply, or reapply, the current config profile and attempt to associate or authenticate to the wireless LAN. Activity is logged in the Diagnotic Output text box on the lower part of the panel.
Release/Renew	Release the current IP address to obtain a new IP address. This option renews the IP address when applicable. Activity is logged in the Diagnostic Output text box. If a fixed IP address has been assigned to the radio, this is also noted in the Diagnostic Output box. Note that the current IP address is displayed next to the Release/Renew button.
Start Ping	Tap the text box and type an IP address to Ping. Tap the Start Ping button to start pinging the IP address. The button name changes to Stop Ping. Tap Stop Ping to end the pinging process. The pinging process ends when any other button on this panel is tapped or a different menu tab is selected. Ping results are displayed in the Diagnostic Output text box.
Diagnostics	Tapping this button begins an attempt to (re)connect to the wireless LAN. This option provides more data in the Diagnostics Output text box than the (Re)connect option. The data dump includes radio state, profile settings, global settings, and a list of access points by SSID broadcasting in the radio's immediate area. *Not available in this release.*
Update Driver	Tap this button to begin the process to update the radio driver via a dialog box and a power cycle. The radio driver file needs to be accessible to the user. *Not available in this release.*
Site Survey	*Not available in this release.*

Global Settings

The parameters on the Global Settings panel can only be changed when an Administrator is logged in with a password. The current values for the parameters can be viewed by the general user without requiring a password.

*Note: Tap the **Commit** button to save changes. If the panel is exited before tapping the Commit button, changes are not saved!*



Factory Default Settings	
RX Diversity	On-Start on Main
TX Diversity	On
Preamble	Auto
G Shorslot	Auto
Roam Trigger	-65 dBm
Roam Delta	10 dBm
Roam Period	10 sec.
Frag Threshold	2346
RTS Threshold	2347
Ping Payload	32 bytes
Ping Timeout	5000
Ping Delay ms	1000
LED	Off
Hide Passwords	On
Admin Password	Blank
Certs Path	System

Figure 5-6 Summit Client Utility – Global Settings tab

Global Parameters

Parameter	Default	Function
RX Diversity	On-start on Main	How to handle antenna diversity when receiving packets from the Access Point. Options are: Main Only (use the main antenna only), Aux Only (use the auxiliary antenna only), On-start on Main (on startup, use the main antenna), or On-start on Aux (on startup, use the auxiliary antenna).
TX Diversity	On	How to handle antenna diversity when transmitting packets to the Access Point. Options are: Main only (use the main antenna only), Aux only (use the auxiliary antenna only), or On (use diversity or both antennas).
Preamble	Auto	The type of radio header, or preamble, for packets. Options are: Auto, Short, or Long.
G Shortslot	Auto	802.1x short slot timing mode. Options are: Auto, On, or Off.

Parameter	Default	Function
Roam Trigger	-65 dBm	If signal strength is less than this trigger value, the radio looks for a different Access Point with a stronger signal. Options are: -50 dBm, -55, -60, -65, -70, or -75 dBm.
Roam Delta	10 dBm	The amount by which a different Access Point signal strength must exceed the current Access Point signal strength before roaming to the different Access Point is attempted. Options are: 5 dBm, 10, 15, 20, 25, 30, or 35 dBm.
Roam Period	10 sec	The amount of time to be used to collect signal strength information from an Access Point before a roaming decision is made. Options are: 5 sec, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, or 60 sec.
Frag Thresh	2346	If the packet size (in bytes) exceeds the specified number of bytes set in the fragment threshold, the packet is fragmented (sent as several pieces instead of as one block). Use a low setting in areas where communication is poor or where there is a great deal of radio interference. Options are: Any number between 256 bytes and 2346 bytes.
RTS Thresh	2347	If the packet size exceeds the specified number of bytes set in the Request to Send (RTS) threshold, an RTS is sent before sending the packet. A low RTS threshold setting can be useful in areas where many client devices are associating with the Access Point. Options are: Any number between 0 and 2347.
Ping Payload	32 bytes	Maximum amount of data to be transmitted on a ping. Options are: 32 bytes, 64, 128, 512, or 1024 bytes.
Ping Timeout ms	5000	The amount of time, in milliseconds, that a device will be continuously pinged. The Stop Ping button can be tapped to end the ping process ahead of the ping timeout. Options are: Any number between 0 and 30000 ms.
Ping Delay ms	1000	The amount of time, in milliseconds, between each ping after a Start Ping button tap. Options are: Any number between 0 and 30000 ms.
LED	Off	The LED on the radio card is not visible to the user when the radio card is installed in a sealed mobile device. Options are: On, Off.

Parameter	Default	Function
Hide Password	On	If On, the Summit Config Utility masks passwords as they are typed and when they are viewed. Options are: On, Off.
Admin Password	SUMMIT	A string of up to 64 alphanumeric characters that must be entered when the Admin Login button is tapped. If Hide Password is On, the password is masked when typed in the Admin Password Entry text box. The password is Case Sensitive. Options are: none.
Certs Path	System	A valid directory path, of up to 64 characters, where WPA Certificate Authority and User Certificates are stored on the mobile device. LXE suggests ensuring the directory path currently exists before assigning the path in this parameter. See sections titled “Root Certificates” and “User Certificates” later in this chapter for instructions on obtaining CA and User Certificates. Options are: none.

Wireless Security

Use the instructions in this section to complete the entries on the Config tab according to the type of wireless security used by your network. The instructions that follow are the minimum required to successfully connect to a network. Your system may require more parameters than are listed in these instructions. Please see your System Administrator for complete information about your network and its wireless security requirements.

Note: It is important that all dates are correct on CE computers when using any type of certificate. Certificates are date sensitive and if the date is not correct authentication will fail.

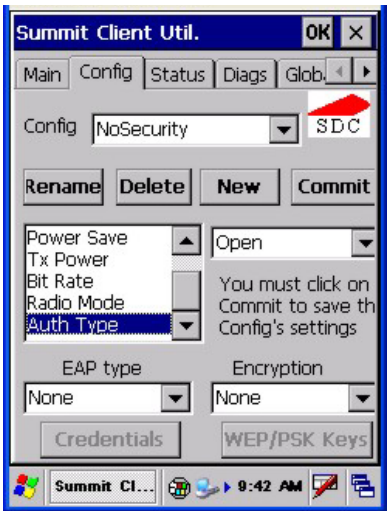
Default profile	LXE recommends editing the Default profile instead of creating new profiles. **Important**: Perform a Warm Reset (or Suspend/Resume) after changing parameters to save the changed parameters in the registry.
Switching profiles	Successfully connecting after switching from one profile to another may take up to 30 seconds from the moment the "Is not authenticated" message is displayed.
Adding, changing or renaming profiles	LXE recommends performing a Warm Reset function (or Suspend/Resume) after tapping the Commit button.

No Security

Start the Summit Utility by tapping the Summit Client icon.

Tap the **Admin Login** button on the Main panel**.** Enter the Administrator **password** and tap OK.

Tap the **Config** tab.



Enter the **SSID** of the Access Point assigned to this profile.

Set **Auth Type** to Open.

Set **EAP Type** to None.

Set **Encryption** to None.

Tap the **Commit** [3] button to save the new profile configuration.

Perform a **Warm Reset** function to connect using the new profile configuration.

Figure 5-7 Configure a Summit Profile with No Security

[3] LXE recommends performing a warm reset or Suspend/Resume function each time the Commit button is tapped.

WEP Keys

Please see your System Administrator for complete information about your network WEP key requirements.

To connect using WEP, use the following minimum required profile options..

- Auth Type = Open
- EAP Type = None
- Encryption = Manual WEP

Tap the **WEP/PSK** Keys button. The WEP Key Entry text entry box appears.

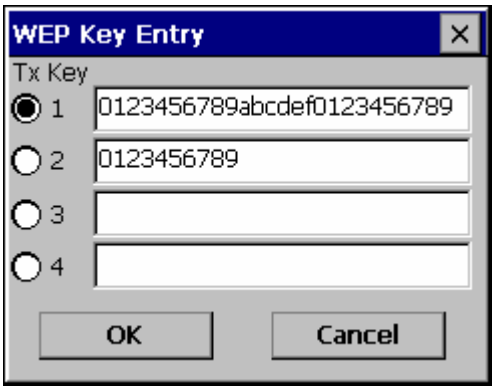


Figure 5-8 WEP Keys

Enter the **WEP key**. If there are more than one set of keys, tap the radio button in front of the Key to be used.

Valid values are 10 characters (for 40 bit encryption) or 26 characters (for 128 bit encryption) hexadecimal characters.

Tap **OK**. Tap the **Commit** button. Perform a **Warm Reset** function.

LEAP w/o WPA Authentication

If the Cisco/CCX certified AP is configured for open authentication, set the Auth Type radio parameter to “Open”.

If the AP is configured for network EAP only, set the Auth Type radio parameter to “LEAP”.

Start the Summit Utility by tapping the Summit Client icon.

Tap the **Admin Login** button on the Main panel**.** Enter the Administrator **password** and tap OK.

Tap the **Config** tab.

Enter the **SSID** of the Access Point assigned to this profile.

Set **Auth Type** to Open.

Set **EAP Type** to LEAP.

Set **Encryption** to Auto WEP.

Tap the **Credentials** button.

Figure 5-9 Configure a Summit Profile with LEAP w/o WPA

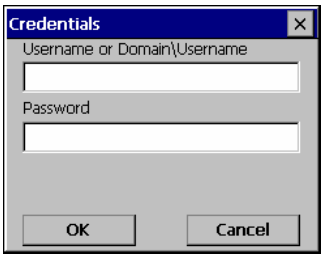


Figure 5-10 LEAP Credentials

Enter the **Username** or Domain \Username in the Credentials popup text entry box.

Enter the **Password**. Tap **OK**.

Tap the **Commit** button to save the new profile configuration.

Perform a **Warm Reset** function to connect using the new profile configuration.

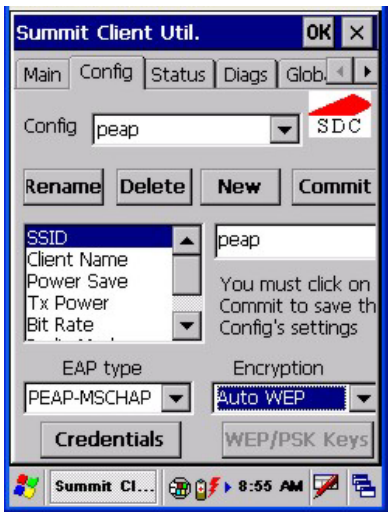
Please see “WPA/LEAP Authentication” later in this section to configure the radio for WPA LEAP.

PEAP/MSCHAP Authentication

Start the Summit Utility by tapping the Summit Client icon.

Tap the **Admin Login** button on the Main panel**.** Enter the Administrator **password** and tap OK.

Tap the **Config** tab.



Enter the **SSID** of the Access Point assigned to this profile.

Set **Auth Type** to Open.

Set **EAP Type** to PEAP-MSCHAP.

Set **Encryption** to Auto WEP (without WPA). To configure PEAP-MSCHAP for WPA set Encryption to WPA TKIP.

Tap the **Credentials** button.

Enter the **Username** or Domain\Username in the Credentials popup text entry box.

Enter the **Password**. Leave the CA Certificate Filename blank for now.

Figure 5-11 Configure a Summit Profile with PEAP/MSCHAP

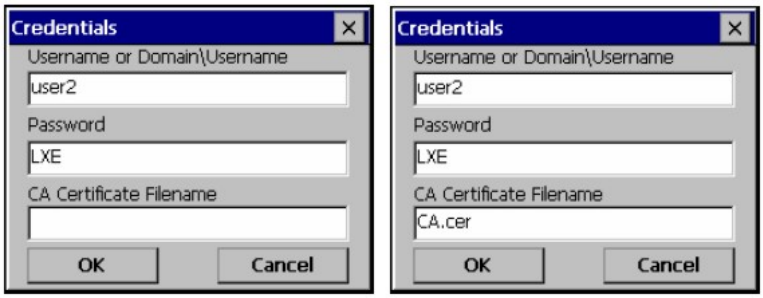


Figure 5-12 PEAP/MSCHAP Credentials

Tap **OK**. Tap **Commit**.

Once successfully authenticated, copy the CA certificate into the System directory of the device. Once the certificate file is in the System directory, enter the filename in **CA Certificate Filename** on the popup Credentials data entry box.

Tap **OK**. Tap **Commit**. Perform a **Warm Reset** function.

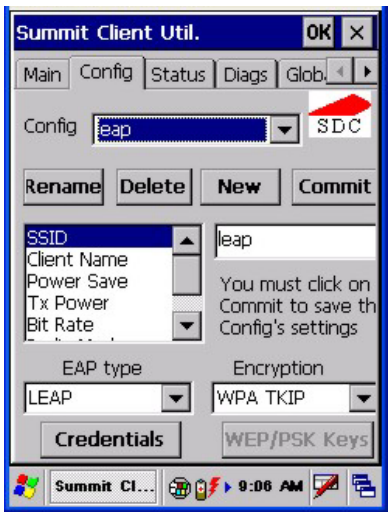
The mobile device should be authenticating the server certificate and using PEAP/MSCHAP for the user authentication.

WPA/LEAP Authentication

Start the Summit Utility by tapping the Summit Client icon.

Tap the **Admin Login** button on the Main panel**.** Enter the Administrator **password** and tap OK.

Tap the **Config** tab.



Enter the **SSID** of the Access Point assigned to this profile.

Set **Auth Type** to Open.

Set **EAP Type** to LEAP.

Set **Encryption** to WPA TKIP.

Tap the **Credentials** button.

Figure 5-13 Configure a Summit Profile with LEAP w/ WPA TKIP

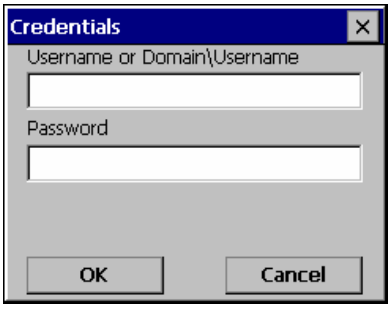


Figure 5-14 LEAP Credentials

Enter the **Username** or Domain \Username in the Credentials popup text entry box.

Enter the **Password**.

Tap **OK**.

Tap the **Commit** button to save the new profile configuration.

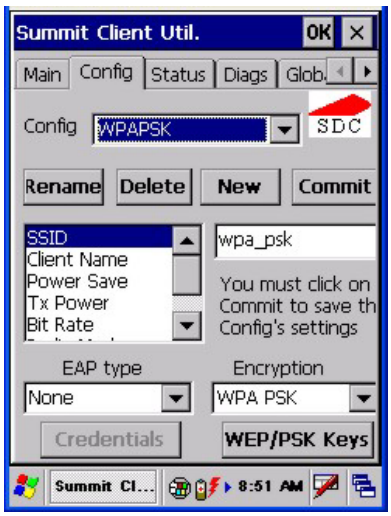
Perform a **Warm Reset** function to connect using the new profile configuration.

WPA PSK Authentication

Start the Summit Utility by tapping the Summit Client icon.

Tap the **Admin Login** button on the Main panel**.** Enter the Administrator **password** and tap OK.

Tap the **Config** tab.



Enter the **SSID** of the Access Point assigned to this profile.

Set **Auth Type** to Open.

Set **EAP Type** to None.

Set **Encryption** to WPA PSK.

Tap the **WEP/PSK Keys** button.

Figure 5-15 Configure a Summit Profile with WPA PSK

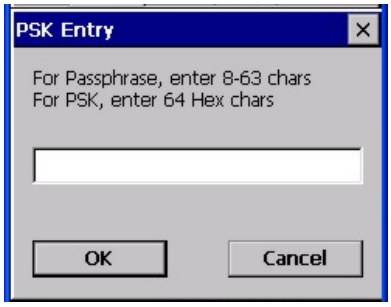


Figure 5-16 PSK Entry Popup

Enter the Passphrase in the **PSK Entry** popup text entry box. This value can be a 64 hex character or an 8-63 byte ASCII value. Tap **OK**

Tap the **Commit** button to save the new profile configuration.

Perform a **Warm Reset** function to connect using the new profile configuration.

Funk Odyssey Client Configuration

Odyssey Client Icon

Start the Funk Odyssey client configuration by tapping the Odyssey Client icon on the desktop or in the taskbar at the bottom right corner of the screen.

	To create a **Funk Odyssey Client user login**, please refer to Chapter 3 "System Configuration", section titled "LXE Login Utility."

For additional information on the Odyssey client see the Funk web site at www funk com.

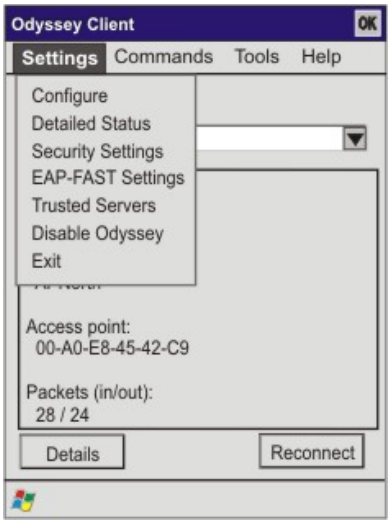
Note: LXE recommends using the Funk Odyssey client to configure the radio. Wireless Zero Config is not recommended for configuring the radio, although it can be used to reveal the IP address.

Prerequisites

- Network SSID or ESSID number of the Access Point
- WEP or LEAP Authentication Protocol Keys

Odyssey Client Menu

Settings



Factory Default Settings	
Settings	
Configure	
Networks	Blank
Detailed Status	Refresh
Security Settings	
Session Resumption	12 hours, Enabled
Automatic Reauthentication	Disabled
Temporary Trust	12 hours, Enabled
EAP-FAST Settings	
Acquire credentials from new server	Enabled
Replace credentials upon failure	Enabled
Trusted Servers	Blank
Disable Odyssey	Immediate disabling
Exit	

Figure 5-17 Odyssey Client Screens – Settings

Configure	Use this option to edit, add and delete networks.
Detailed Status	Configure advanced security options related to authentication.
Security Settings	This option allows the user to enable session resumption, automatic reauthentication and server temporary trust.
EAP-FAST Settings	Configure Odyssey to prompt for permission before acquiring new EAP-FAST credentials.

Trusted Servers	Use this option to edit, add and delete trusted servers and server certificates.
Disable Odyssey	Tapping this menu option disables Odyssey immediately. Odyssey should be disabled before setting Wireless Zero Config options.
Exit	Immediately exits the Odyssey client utility. Changes are saved when the panel closes. The Odyssey icon remains in the toolbar.

Commands

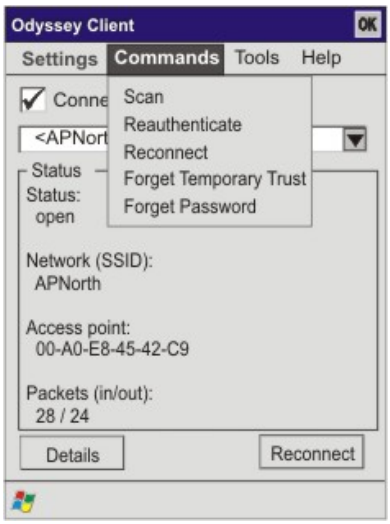


Figure 5-18 Odyssey Client Screens – Commands

Scan	Displays a list of all wireless networks that are currently reachable.
Reauthenticate	Selecting this option causes the Odyssey Client to reauthenticate your radio over the existing connection without starting a new connection. If dynamic encryption keys are in use, they are refreshed.
Reconnect	The existing AP connection is disconnected and a new connection process to the selected wireless network is started.
Forget Temporary Trust	Use this command to immediately discard the list of temporarily trusted servers.
Forget Password	Use this command to immediately discard any typed passwords. This will remove them from memory.

Tools

Figure 5-19 Odyssey Client Screens – Tools

Import User Certificate	See section titled “User Certificates” for instruction.
Certificate Enroller	Use this option to request a certificate from a server. See section titled “Root Certificates” for instruction.
SIM Card Manager	Manage the PIN on the SIM card hardware (if installed).

Help

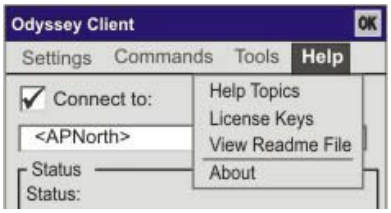


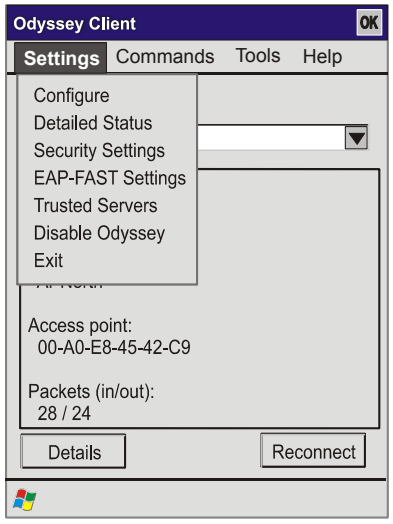
Figure 5-20 Odyssey Client Screens – Help

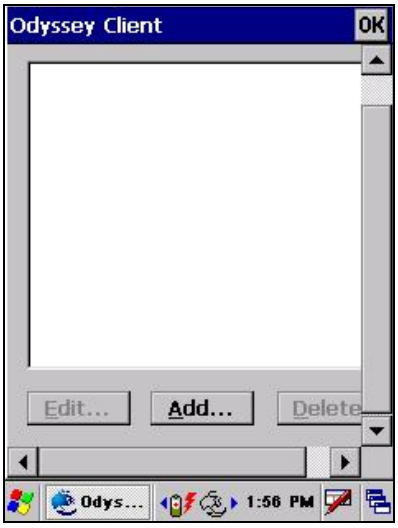
Help Topics	Odyssey local help.
License Keys	Displays a text sequence that represents the Odyssey Client software license. An option is available to enter a new license key.
View Readme Files	Readme.txt file is displayed.
About	Displays Odyssey Client version number and software license information.

Wireless Security

Date/Time	It is important that all dates are correct on CE computers when using any type of certificate. Certificates are date sensitive and if the date is not correct authentication will fail.

Set WEP





Funk Odyssey Client Settings Menu **Tap Add to Configure a Profile**

Figure 5-21 Funk Odyssey Client Settings Menu

Start the Funk Odyssey client configuration by tapping the Odyssey Client icon.

Tap **Settings | Configure.**

Tap the **Add** button to configure a profile. The “Add Network Wizard” screen is displayed.

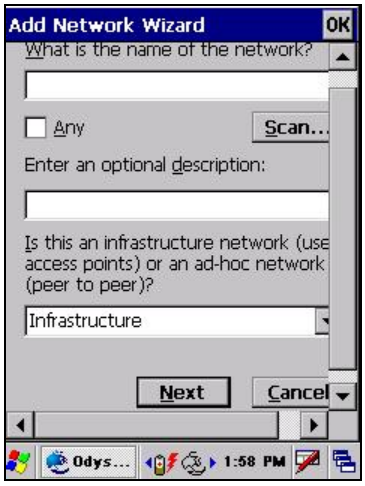


Figure 5-22 Add Network Wizard Screen

On the Add Network Wizard screen enter the **SSID** of the wireless network. If the SSID is being broadcast by the AP, tap Scan and choose the correct SSID.

Choose **Infrastructure** for the network type. Tap the Next button to continue or the Cancel button to ignore changes made on this screen.

No Encryption

Figure 5-23 Set Encryption Mode to None

Set the **Association Mode** to Open. Set the **Encryption Method** to None. Disable the **Authenticate using 802.1X** checkbox. Disable the **Keys will …** checkbox if needed.

Tap Next to continue. Status shows as “open”. Authentication is not in use. Encryption is not in use.

WEP Encryption

Figure 5-24 Set Encryption Mode to WEP

Set the **Association Mode** to Open.

Set the **Encryption Method** to WEP.

Disable the **Authenticate using 802.1X** checkbox.

Disable the **Keys will …** checkbox if needed. Tap Next to continue.

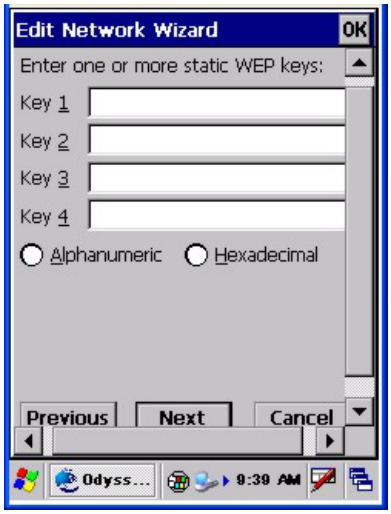


Figure 5-25 Setting Static WEP Keys

Enter a 40 bit or 128 bit WEP key. The default is blank for all keys and radio buttons.

If the WEP key is in *alphanumeric* format, enable the Alphanumeric radio button.

- 40 bit up to 5 characters
- 128 bit up to 13 characters

If the WEP key is in *hexadecimal* format, enable the Hexadecimal radio button.

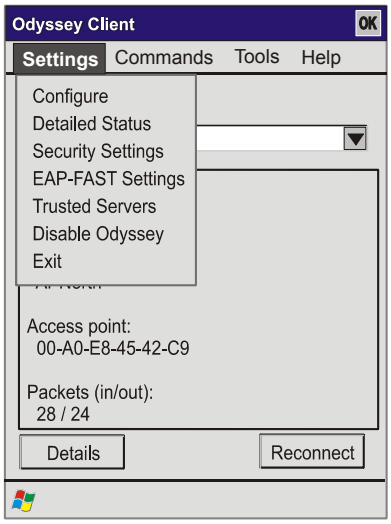
- 40 bit up to 10 characters
- 128 bit up to 26 characters

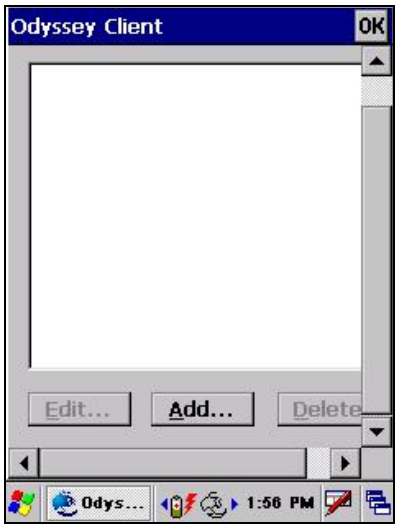
Enter the WEP key and tap **Next** to continue, Previous to return to the previous screen or Cancel to ignore changes made to this screen.

After pressing Next, tap Finish to return to the Profile screen.

Tap OK to end assigning WEP for security.

Set LEAP





Funk Odyssey Client Settings Menu **Tap Add to Configure a Profile**

Figure 5-26 Funk Odyssey Client Settings Menu

Start the Funk Odyssey client configuration by tapping the Odyssey Client icon.

Tap **Settings | Configure.**

Tap the **Add** button to configure a profile. The "Add Network Wizard" screen is displayed.

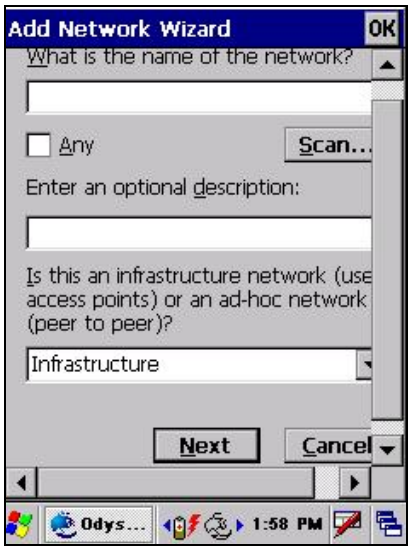


Figure 5-27 Add Network Wizard Screen

On the Add Network Wizard screen enter the **SSID** of the wireless network. If the SSID is being broadcast by the AP, tap Scan and choose the correct SSID.

Choose **Infrastructure** for the network type. Tap the Next button to continue or the Cancel button to ignore changes made on this screen.

Figure 5-28 Set Encryption Mode to LEAP

Set the **Association Mode** to Open.

Set the **Encryption Method** to WEP.

Enable the **Authenticate using 802.1X** checkbox.

Enable the **Keys will ...** checkbox. Tap **Next** to continue.

WEP Authentication for LEAP

The Funk Odyssey supplicant authenticates a user with the LEAP protocol. Your system may have EAP-LEAP and/or LEAP in the method drop down list. EAP-LEAP protocol can be used for LEAP authentication.

Use the remove and add buttons to choose EAP-LEAP authentication. EAP-LEAP does not use server side authentication so the Validate server box is dimmed. Tap **Next**.

Figure 5-29 EAP-LEAP Method

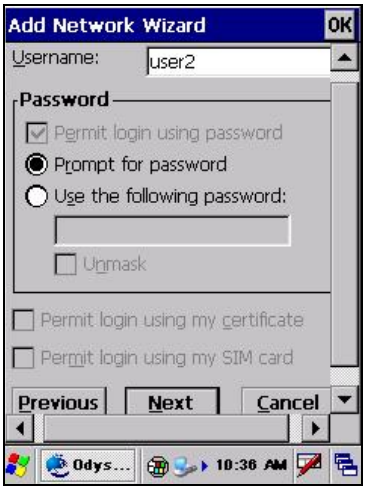


Figure 5-30 Create Username and Password Method

Enter a Username.

For the username Password tap the radio button for either **Prompt for password** or **Use the following password**.

Tap the **OK** button then **Finish**.

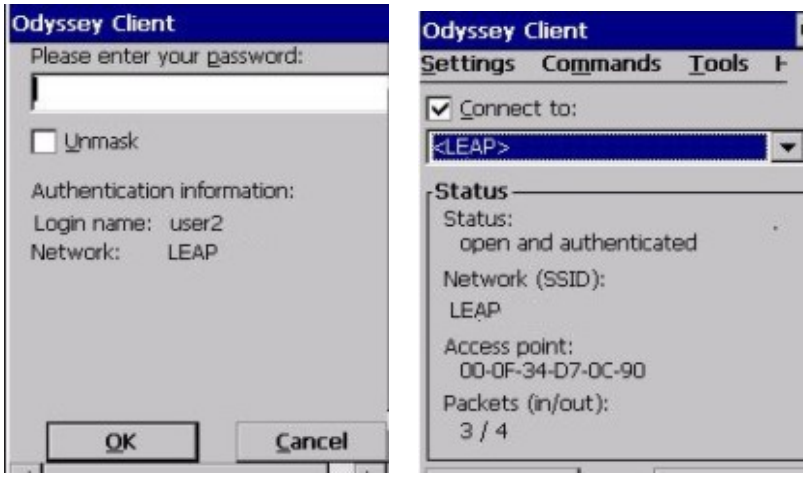


Figure 5-31 Enter Password for LEAP

When prompted for the password enter the valid password to authenticate.

Once authenticated the Status shows as “open and authenticated”.

Set WPA

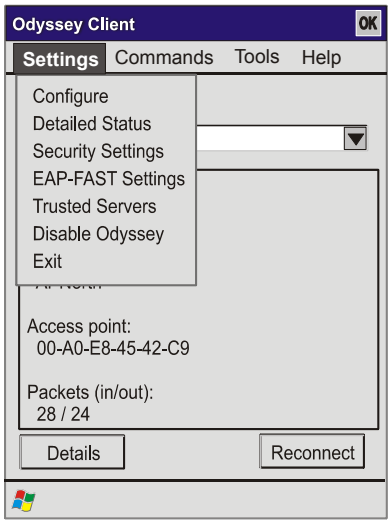


Figure 5-32 Funk Odyssey Client Settings Menu

Tap **Settings | Configure.**

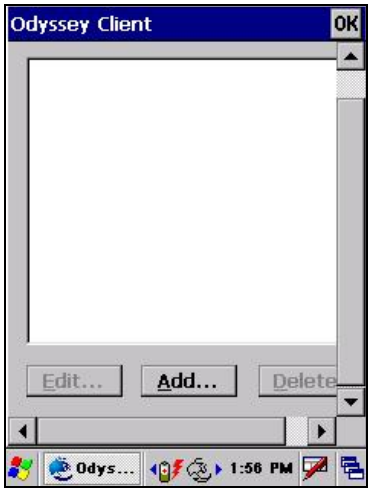


Figure 5-33 Tap Add to Configure a Profile

Tap the **Add** button to configure a profile. The “Add Network Wizard” screen is displayed.

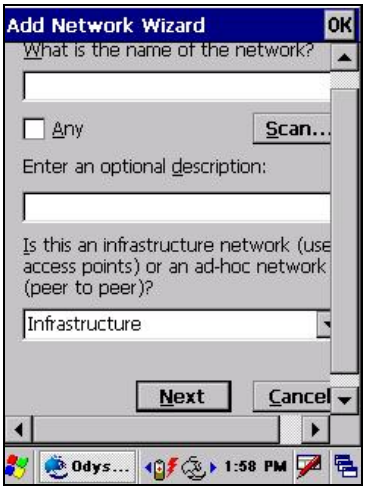


Figure 5-34 Add Network Wizard Screen

On the Add Network Wizard screen enter the **SSID** of the wireless network. If the SSID is being broadcast by the AP, tap Scan and choose the correct SSID.

Choose **Infrastructure** for the network type. Tap the Next button to continue or the Cancel button to ignore changes made on this screen.

Figure 5-35 Set Association Mode to WPA

Set the **Association Mode** to WPA.

Set the **Encryption Method** to TKIP.

For all WPA authentications except WPA/PSK check the **Authenticate using 802.1X** box.

The **Keys will …** box will be grayed out when the Encryption Method is set to TKIP.

In the following sections each authentication method configuration is described. Tap **Next** to continue, Previous to return to the previous screen or Cancel to ignore changes made to this screen.

PEAP/MS-CHAP Authentication Configuration

The Funk Odyssey supplicant authenticates a user with the PEAP/MS-CHAP protocol.

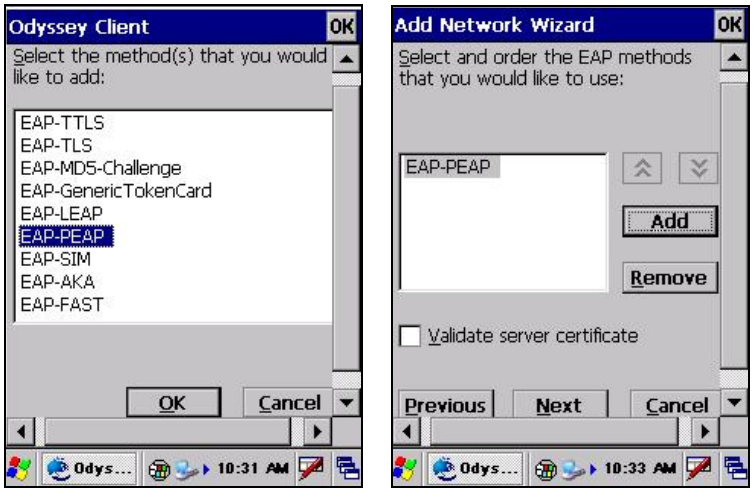


Figure 5-36 Select Method

Use the delete and add buttons to choose EAP-PEAP authentication.

Uncheck the Validate server certificate for now.

Tap **Next** to continue, Previous to return to the previous screen or Cancel to ignore changes made to this screen.

Add Network Wizard
OK
You can enter an anonymous name to keep your login name private with most EAP protocols. Enter an anonymous name that will be used for the outer, visible authentication.
It may contain realm names that route your request (e.g. "anonymous" or "anonymous@myisp.com"):
user2
Previous
Next
Cancel
Odys...
10:34 AM

Figure 5-37 User Name for Phase 1 Authentication

A screen appears asking for an **anonymous sign-on name**. This is for the outer (or Phase 1) authentication.

Enter the correct outer authentication (this could be the Phase 2 authentication as well).

Tap **Next** to continue, Previous to return to the previous screen or Cancel to ignore changes made to this screen.

The next screen displayed is a configuration screen that allows you to choose the correct version of PEAP.

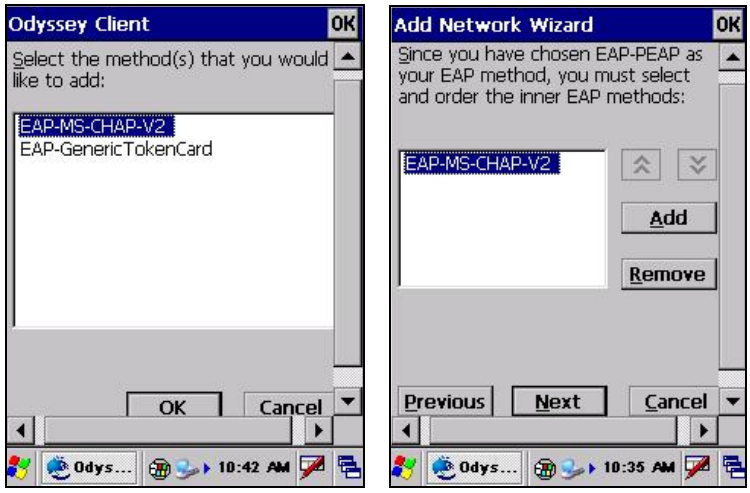


Figure 5-38 Select EAP-MS-CHAP-V2

For PEAP/MS-CHAP use the Add/Remove buttons to choose EAP-MS-CHAP-V2.

Tap **Next** to continue, Previous to return to the previous screen or Cancel to ignore changes made to this screen.

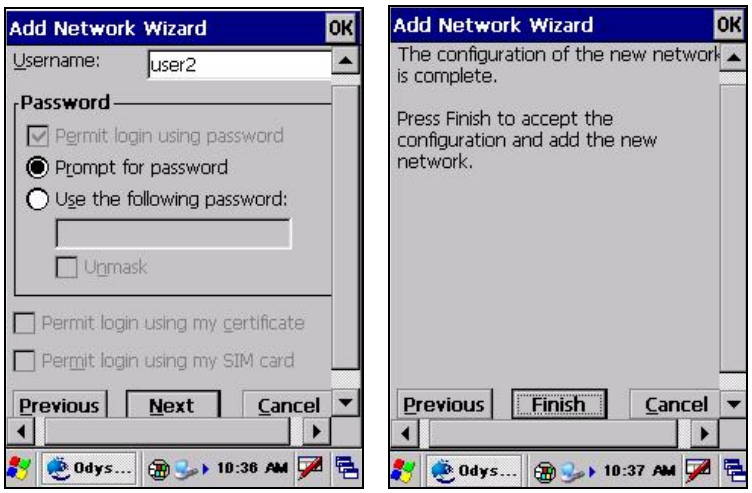


Figure 5-39 User Name and Password for Phase 2 Authentication

A screen appears asking for a user name. This is for the inner (or Phase 2) user name.

Under Password, choose “Prompt for password” or “Use the following password” radio buttons.

Tap the **OK** button.

Then tap **Finish** on the “The configuration of the new network is complete.” screen.

On the main configuration screen check the **Connect to** box and choose the profile just configured.

Once connected the status should change to open and authenticated as shown in the figure below.

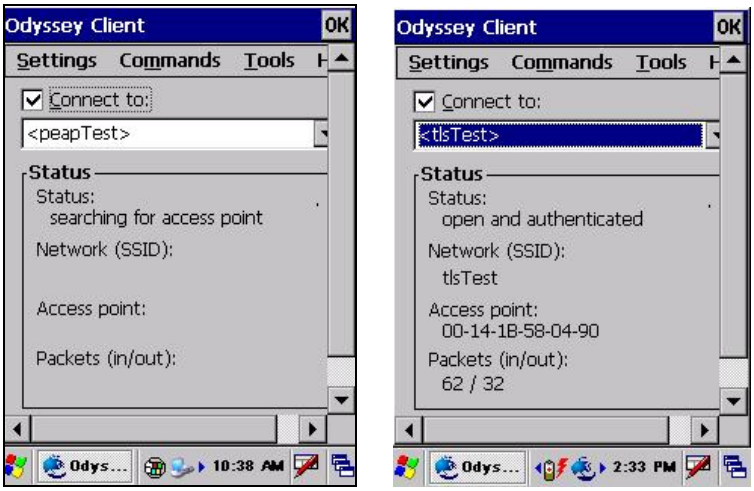


Figure 5-40 Connect to New Profile

Now that the connection works change the configuration to authenticate the server. See "Server Authentication."

Server Authentication

To validate the server certificate the root CA certificate must be installed. For instructions for installing see section titled “Root Certificates”.

The RADIUS server certificate is not required, only the root CA which issued the server certificate.

Next configure the Root CA Certificate as a Trusted Root CA as described in the section titled “Trusted Server Configuration”.

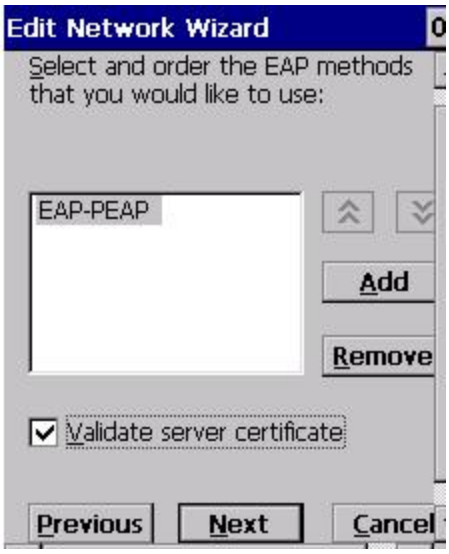


Figure 5-41 Validate Server Certificate

Navigate back to the authentication type screen and check the **Validate server certificate** box.

Tap **Next** to the end then the **Finish** buttons.

Tap **OK** to end the configuration process.

PEAP/GTC Authentication Configuration

The Funk Odyssey supplicant authenticates a user with the PEAP/GTC protocol. Use the delete and add buttons to choose PEAP/GTC authentication.

Uncheck the Validate server certificate for now.

Tap **Next**.

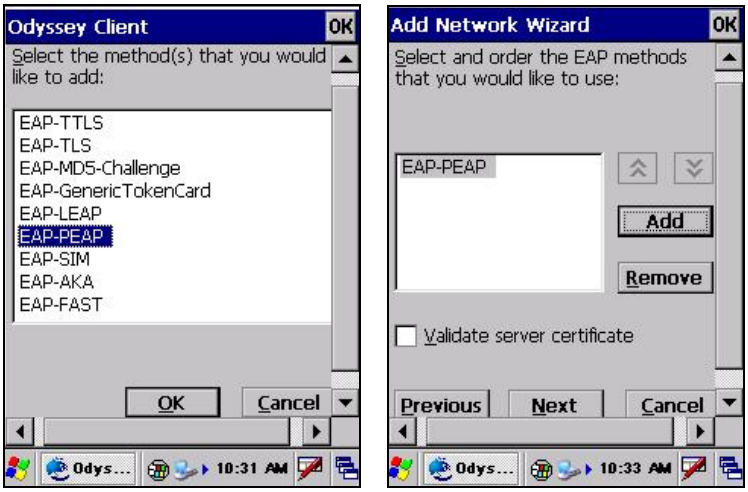


Figure 5-42 PEAP/GTC Authentication Configuration

Tap **Next** to continue, Previous to return to the previous screen or Cancel to ignore changes made to this screen.

Add Network Wizard
OK
You can enter an anonymous name to keep your login name private with most EAP protocols. Enter an anonymous name that will be used for the outer, visible authentication.
It may contain realm names that route your request (e.g. "anonymous" or "anonymous@myisp.com"):
user2
Previous
Next
Cancel
Odys...
10:34 AM

Figure 5-43 User Name for Outer Authentication

A screen appears asking for an **anonymous sign-on name**. This is for the outer (or Phase 1) authentication. Enter the correct outer authentication (this could be the Phase 2 authentication as well). Tap **Next** to continue, Previous to return to the previous screen or Cancel to ignore changes made to this screen.

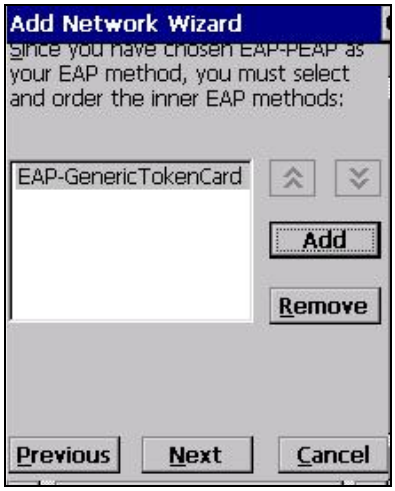


Figure 5-44 Choose Correct Version of PEAP

By choosing EAP-PEAP another configuration screen appears to chose the correct version of PEAP.

For PEAP/GTC use the Add/Remove buttons to choose **EAP-GenericTokenCard**.

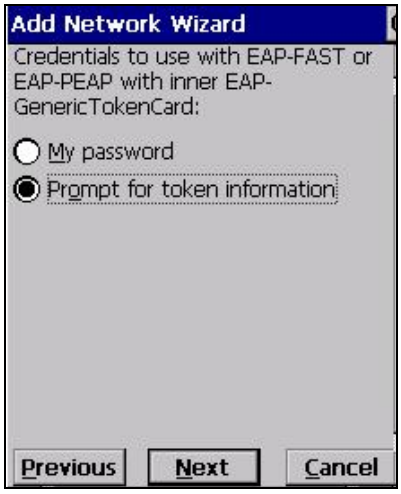


Figure 5-45 EAP-PEAP Credential Choice

Choose correct credential configuration.

To be prompted for the token, tap the “Prompt for token information” radio button.

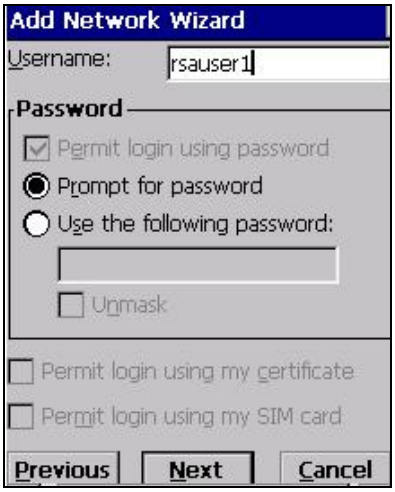


Figure 5-46 Prompt for Password

Enter a **Username**.

For the username Password tap the radio button for “Prompt for password” or “Use the following password.”

Tap the **OK** button then Finish.

On the main configuration screen check the **Connect to** checkbox and choose the profile you just configured.

When prompted for the password enter it into the password field.

Figure 5-47 Enter the Profile Password

Use the Unmask checkbox to see the password in clear text as you type.

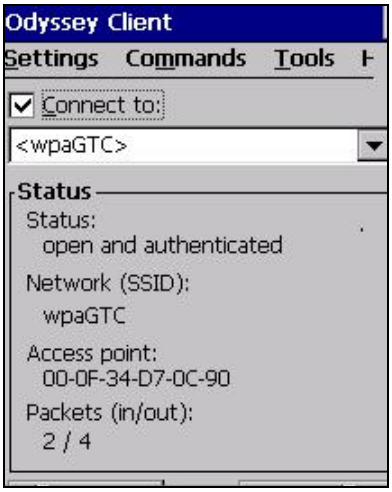


Figure 5-48 Authentication is Successful

When authentication is successful the Status on the main screen displays “open and authenticated.”

Server Authentication

To validate the server certificate the root CA certificate must be installed. For instructions for installing see section titled “Root Certificates”.

The RADIUS server certificate is not required, only the root CA which issued the server certificate.

Next configure the Root CA Certificate as a Trusted Root CA as described in the section titled “Trusted Server Configuration”.

Navigate back to the authentication type screen and check the “Validate server certificate” checkbox.

Tap **Next** to the end then Finish buttons. Tap **OK** to end the configuration process.

Figure 5-49 Validate Server Certificate for PEAP/GTC

Navigate back to the authentication type screen and **enable** the Validate server certificate checkbox.

Tap **Next** to the end then the Finish buttons.

Tap **OK** to end configuration.

EAP-LEAP Authentication

The Funk Odyssey supplicant authenticates a user with the EAP-LEAP protocol.

Use the delete and add buttons to choose EAP-LEAP authentication. Your system may have EAP-LEAP and/or LEAP in the method drop down list. EAP-LEAP protocol can be used for LEAP authentication.

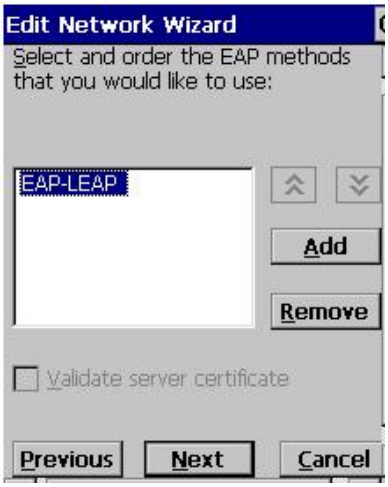


Figure 5-50 EAP-LEAP Method

EAP-LEAP does not use server side authentication so the Validate server box is grayed out.

Tap **Next**.

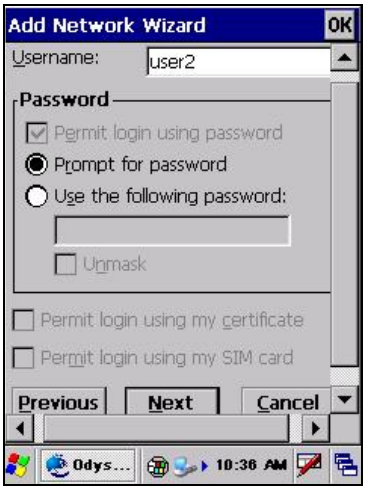


Figure 5-51 Create Username and Password Method

Enter a Username.

For the username Password tap the radio button for either **Prompt for password** or **Use the following password**.

Tap the OK button then Finish.

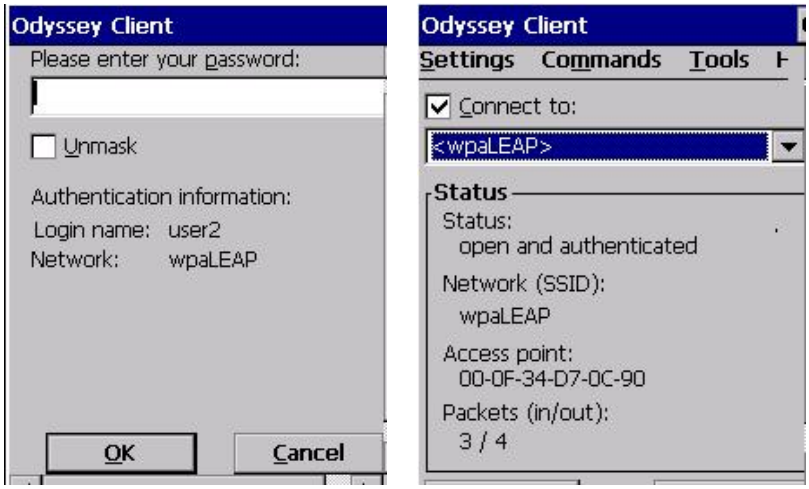


Figure 5-52 Enter Password for EAP-LEAP

When prompted for the password enter the valid password to authenticate.

Once authenticated the Status shows as “open and authenticated”.

EAP/TLS Authentication Configuration

To authenticate using the EAP/TLS protocol you will need a user certificate file and a private key file.

Once you have the user certificate files run the certificate installer from the Microsoft control panel as described in the section titled “Root Certificates”.

Note: It is important that all dates are correct on the CE devices when using any type of certificate. Certificates are date sensitive and if the date is not correct authentication will fail.

Installing User Certificate

Navigate to **Start | Settings | Control Panel | Certificates.**

Choose **My Certificates** in the drop down list.

Tap the **Import** button.

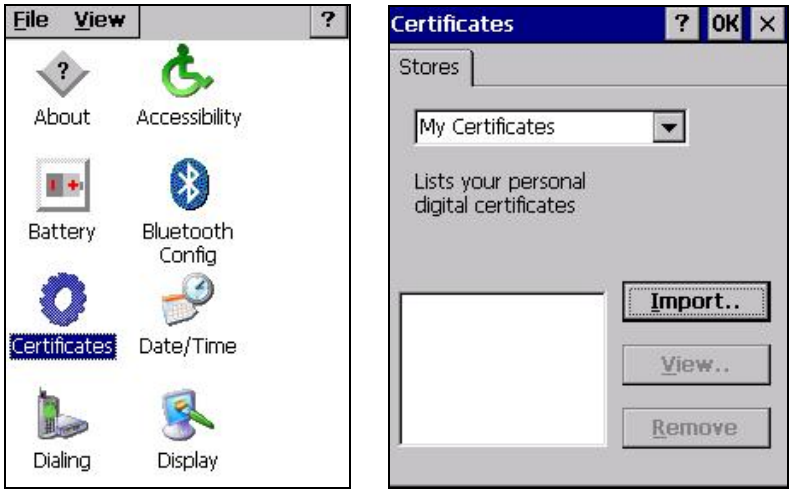


Figure 5-53 Install User Certificate

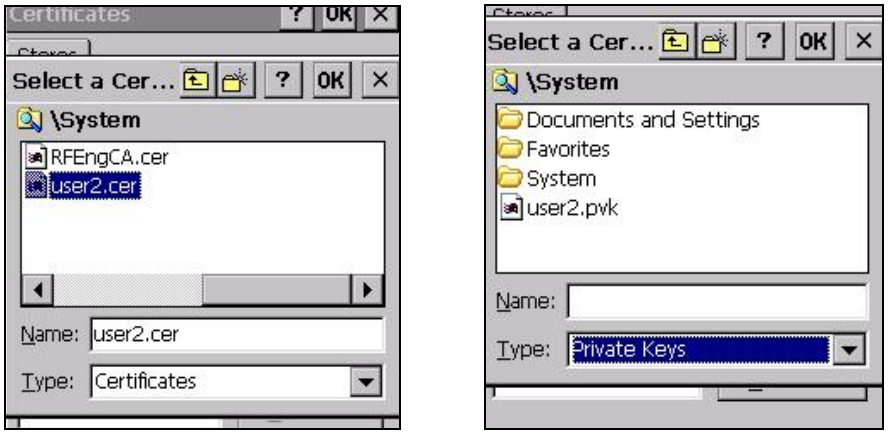


Figure 5-54 Install Private Key for Certificate

Tap **OK** to import from file.

Navigate to the location where the certificate file was copied.

Choose the certificate then navigate to the same place and choose to install the private key for the certificate.

Enter the password for the private key.

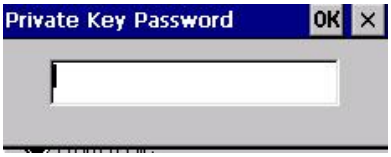


Figure 5-55 Enter Password for Private Key

To verify the user certificate navigate to **Start | Settings | Control Panel | Certificates** – My Certificates.

Tap the certificate and choose View.

Tap Private Key and look in the details pane to make sure the key is "Present."

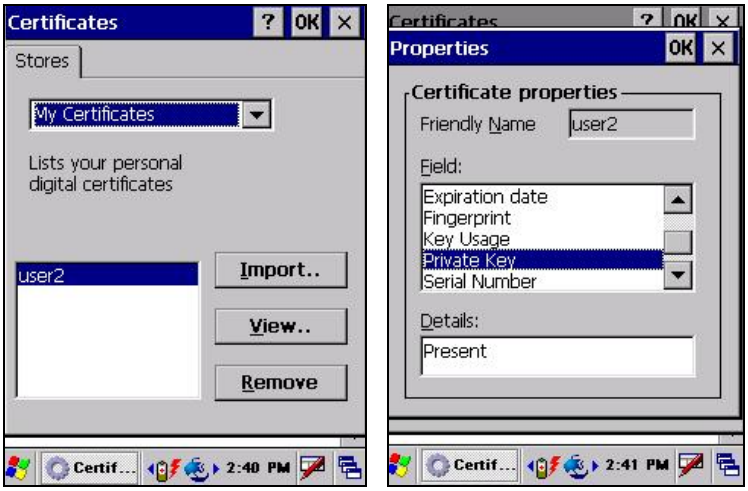


Figure 5-56 Verify User Certificate

Setting EAP/TLS Parameters

The Funk Odyssey supplicant authenticates a user with the EAP/TLS protocol.

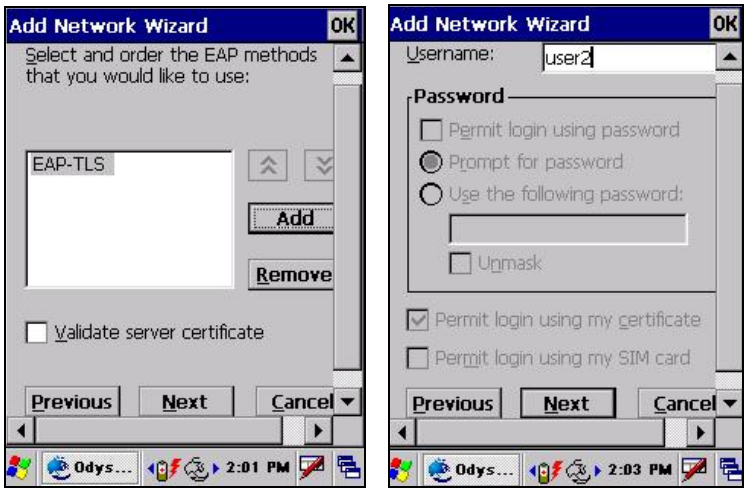


Figure 5-57 Authenticate a User

Use the delete and add buttons to choose EAP/TLS authentication.

Uncheck the “Validate server certificate” for now.

Tap **Next**.

Enter the username on the user certificate to be used for authentication.

Tap **Next**.

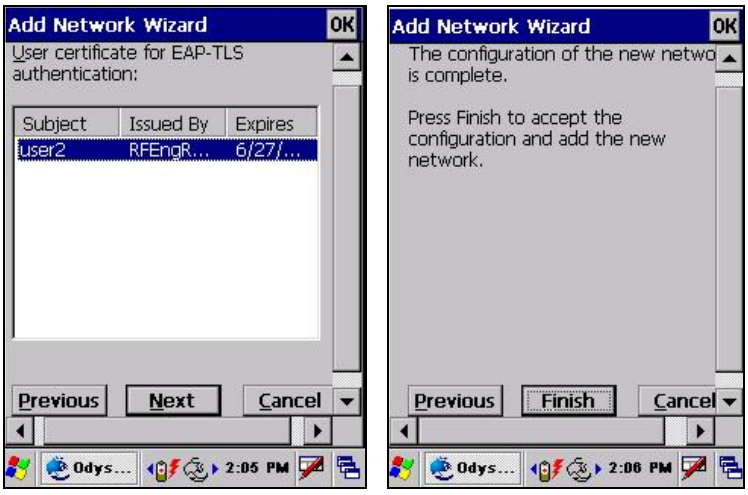


Figure 5-58 Completed Network Configuration

Choose the user certificate for authentication. Tap **Finish** to complete the configuration.

Explore the profile just created.

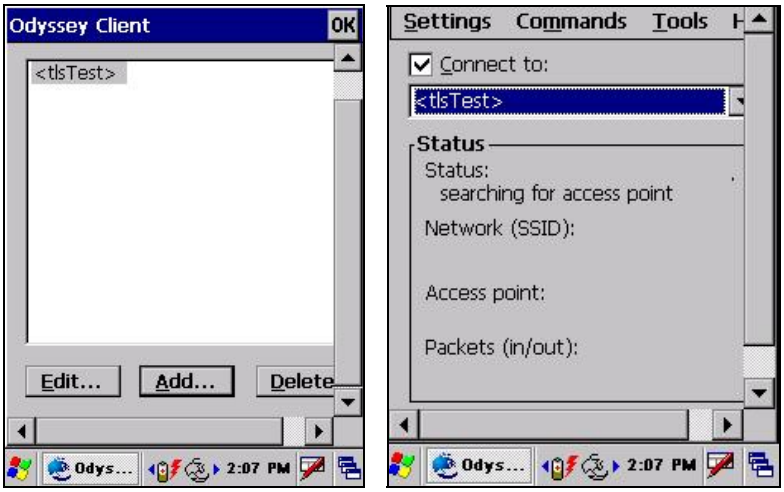


Figure 5-59 Choose the New Profile

Tap the **OK** button in the top right corner.

On the main configuration screen check the **Connect to** box and choose the profile just configured.

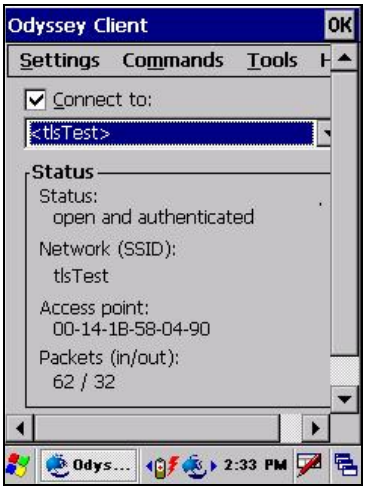


Figure 5-60 Status is open and authenticated

Once configured the status shows “authenticating” then once authenticated it shows “open and authenticated.”

To check the EAP-TLS status tap **Settings | Detailed Status**.

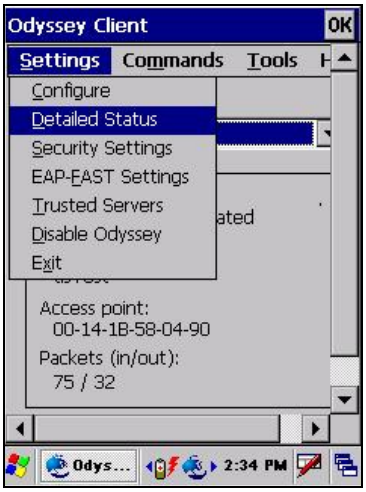


Figure 5-61 Settings – Detailed Status Menu Option

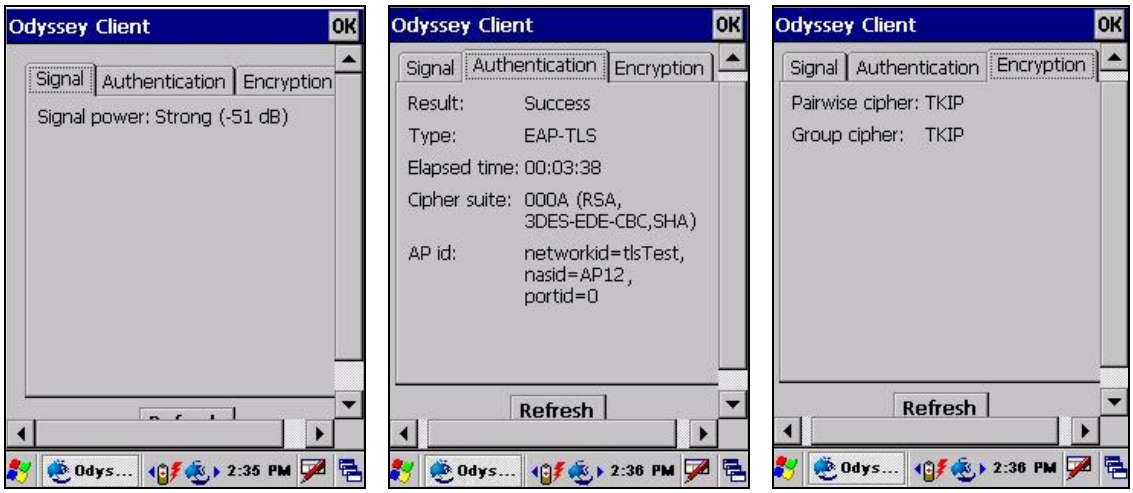


Figure 5-62 Detailed Status is Displayed – Signal, Authentication, Encryption

Validating the Server Certificate

To validate the server certificate the root CA certificate must be installed. For instructions for installing see section titled “Root Certificates”.

The RADIUS server certificate is not required, only the root CA which issued the server certificate.

Next configure the Root CA Certificate as a Trusted Root CA as described in the section titled “Trusted Server Configuration”.

Navigate back to the authentication type screen and check the “Validate server certificate” checkbox.

Tap **Next** to the end then Finish buttons. Tap **OK** to end the configuration process.

Figure 5-63 Enable the “Validate server certificate” Checkbox

WPA/PSK Configuration

To start the WPA/PSK configuration tap **Settings | Configure**.

Tap the **Add** button to configure a profile.

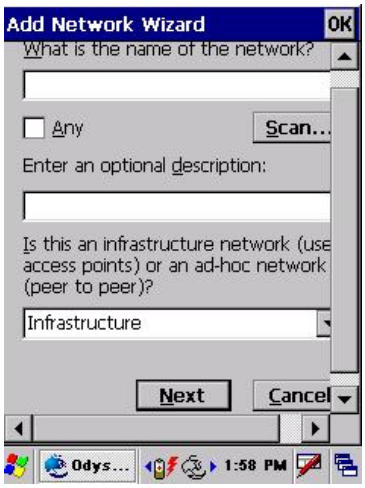


Figure 5-64 Enter Name of Network

On the Add Network Wizard screen type the SSID of the wireless network. If the SSID is being broadcast by the AP, press **Scan** and choose the correct SSID.

Choose **Infrastructure** for the network type.

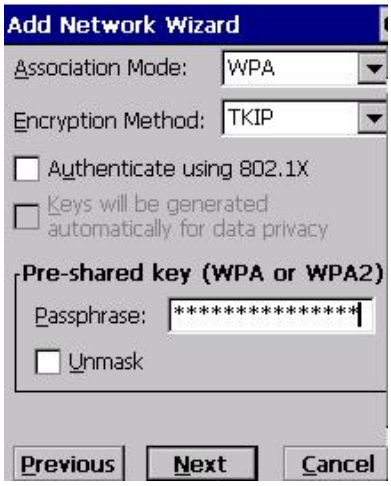


Figure 5-65 Set the Association Mode to WPA

Set the **Association** mode to "WPA" and **Encryption Method** to "TKIP".

For WPA/PSK uncheck the "Authenticate using 802.1X" checkbox.

"Keys will …" box is grayed out when the encryption method is set to TKIP. Enter the Pre-shared key as entered in the AP. Tap **Next** and Finish to complete the configuration.

Now you are ready to connect the MX7 to the AP.

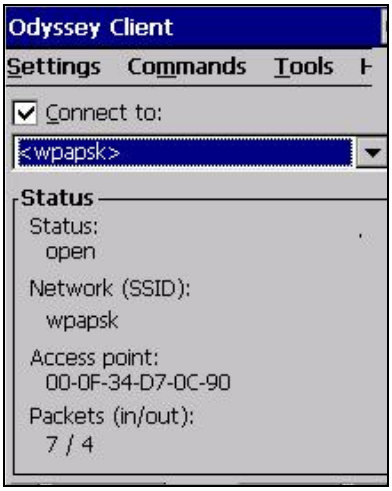


Figure 5-66 Connect the MX7 and the AP

Tap the “Connect to:” box and the MX7 then connects to the AP.

Trusted Server Configuration

To validate the server side certificates a Trusted Server must be configured. Install the Root CA certificate as described in the section titled “Root Certificates.” Then use the following directions to configure the Odyssey client to use the Root CA Certificate.

Navigate to **Settings | Trusted Servers**.

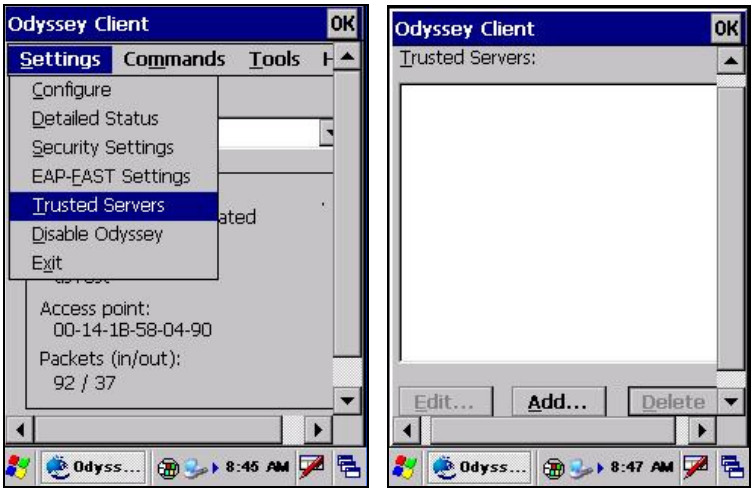


Figure 5-67 Settings – Trusted Servers Menu Option

Tap the **Add** button.

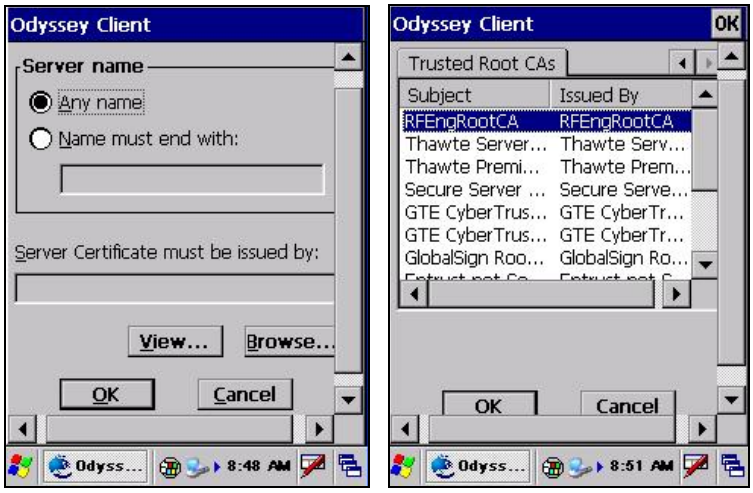


Figure 5-68 Select a Trusted Root CA

Tap **Browse**.

Tap the Trusted Root CAs tab.

Choose the correct Root CA certificate. Tap OK.

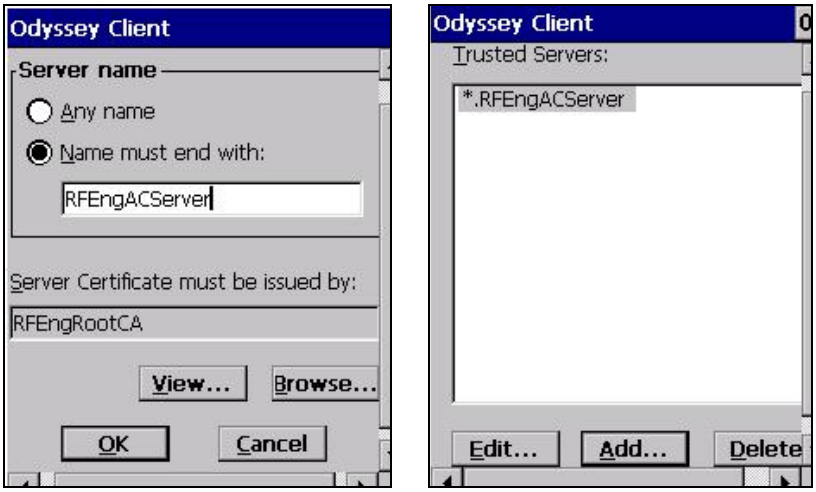


Figure 5-69 Configuring a Trusted Server Certificate

The Server Certificate is listed in the grayed box.

To authenticate the RADIUS server only, change the **Server name** button to "Name must end with:".

Enter the **name of the RADIUS certificate** as shown in the screen titled "Trusted Servers."

Tap the **OK** button. The server name should be listed in the box.

Tap the **OK** button. The trusted server certificate is configured for the MX7.

Root Certificates

Date/Time	It is important that all dates are correct on CE and desktop/laptop computers when using any type of certificate. Certificates are date sensitive and if the date is not correct authentication will fail.

Downloading a Root CA Certificate to a PC

	Please refer to the “LXE Security Primer” for more information on obtaining and installing root certificates.

The easiest way to get the root CA certificate is to use a browser on a desktop PC to navigate to the CA (Certificate Authority). To request the root CA certificate, open a browser to

http://<CA IP address>/certsrv

Sign into the CA with any valid username and password.

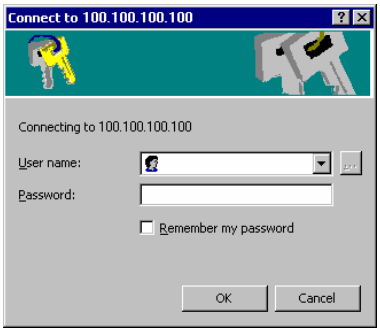


Figure 5-70 Logon to Certificate Authority

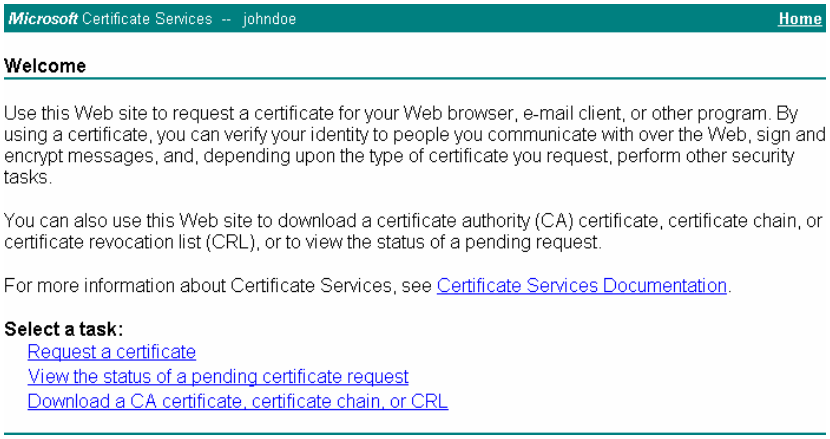

Microsoft Certificate Services -- johndoe
Home
Welcome
Use this Web site to request a certificate for your Web browser, e-mail client, or other program. By using a certificate, you can verify your identity to people you communicate with over the Web, sign and encrypt messages, and, depending upon the type of certificate you request, perform other security tasks.
You can also use this Web site to download a certificate authority (CA) certificate, certificate chain, or certificate revocation list (CRL), or to view the status of a pending request.
For more information about Certificate Services, see Certificate Services Documentation.
Select a task:
Request a certificate
View the status of a pending certificate request
Download a CA certificate, certificate chain, or CRL

Figure 5-71 Certificate Services Welcome Screen

Tap the **Download a CA certificate, certificate chain or CRL** task link.

Make sure the correct root **CA certificate** is selected in the list box.

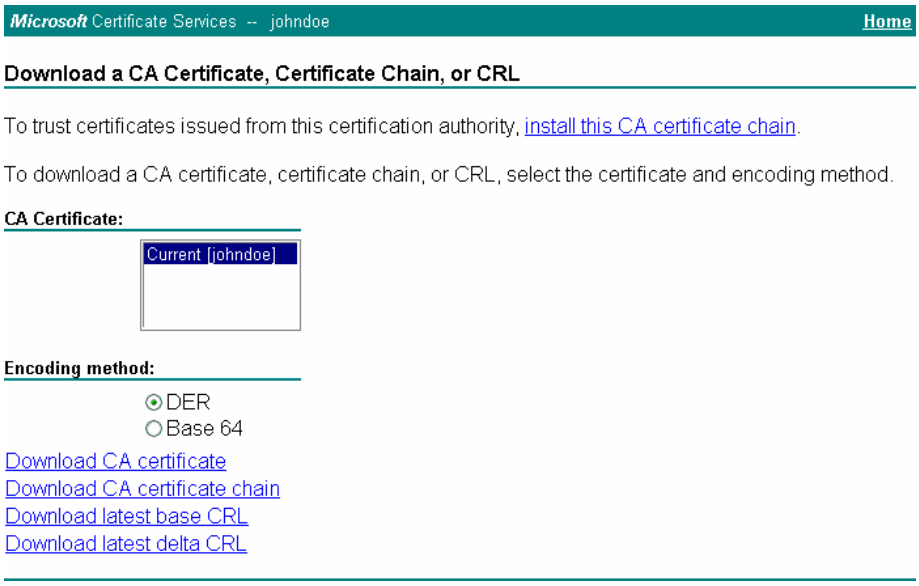

Microsoft Certificate Services -- johndoe
Home
Download a CA Certificate, Certificate Chain, or CRL
To trust certificates issued from this certification authority, install this CA certificate chain.
To download a CA certificate, certificate chain, or CRL, select the certificate and encoding method.
CA Certificate:
Current [johndoe]
Encoding method:
DER
Base 64
Download CA certificate
Download CA certificate chain
Download latest base CRL
Download latest delta CRL

Figure 5-72 Select Encoding Method before Downloading

Tap the **DER** button.

To download the CA certificate, tap on the **Download CA certificate** link.

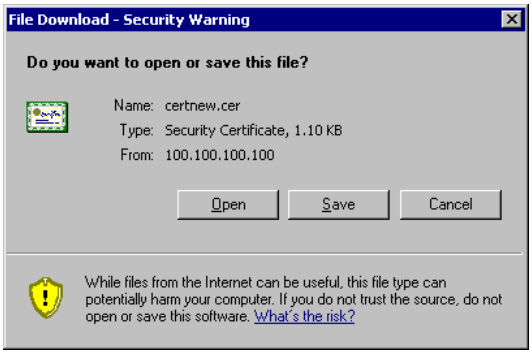

File Download - Security Warning
Do you want to open or save this file?
Name: certnew.cer
Type: Security Certificate, 1.10 KB
From: 100.100.100.100
Open
Save
Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not open or save this software. What's the risk?

Figure 5-73 Download CA Certificate Screen

Tap the **Save** button and save the certificate to the desktop PC. Keep track of the name and location of the certificate as the certificate file name and file location is required in later steps.

Installing a Root CA Certificate on the Mobile Device

Copy the certificate file from the desktop PC to the mobile device. Import the certificate by navigating to **Start | Settings | Control Panel | Certificates**.

Figure 5-74 Certificate Stores

Tap the "**Import**" button.

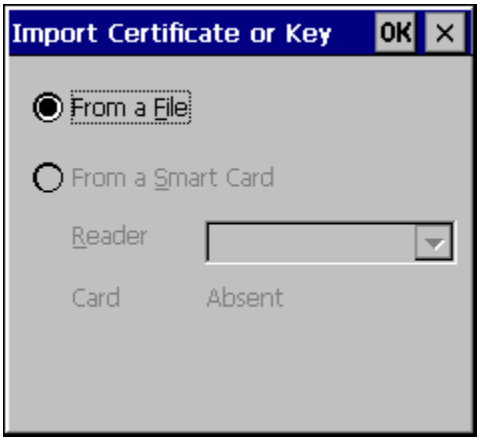


Figure 5-75 Import the Certificate

Make sure "**From a File**" is selected and tap OK.

Figure 5-76 Browse to the Certificate Location on the MX7

Using the Explorer buttons, browse to the location where you copied the certificate, select the certificate desired and tap OK.

When the text box appears asking if you want to ADD the following certificate to the Root Store, tap **Yes** to import the certificate.

Once the certificate is installed, return to the proper authentication section, described later in this chapter.

User Certificates

Date/Time	It is important that all dates are correct on CE and desktop/laptop computers when using any type of certificate. Certificates are date sensitive and if the date is not correct authentication will fail.

Generating a User Certificate for the Mobile Device

	Please refer to the "LXE Security Primer" for more information on obtaining and installing user certificates.

The easiest way to get the user certificate is to use a browser on a PC to navigate to the CA. To request the user certificate, open a browser to

http://<CA IP address>/certsrv

Sign into the CA with the username and password of the person who will be logging into the mobile device.

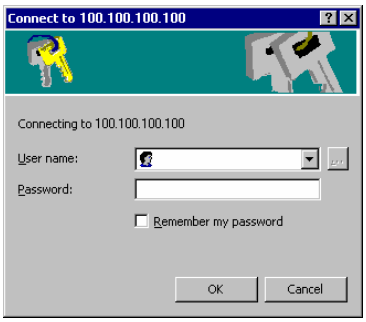


Figure 5-77 Logon to Certificate Authority

Important: This process saves a user certificate and a separate private key file. CE devices such as the MX7 require the private key to be saved as a separate file rather than including the private key in the user certificate.

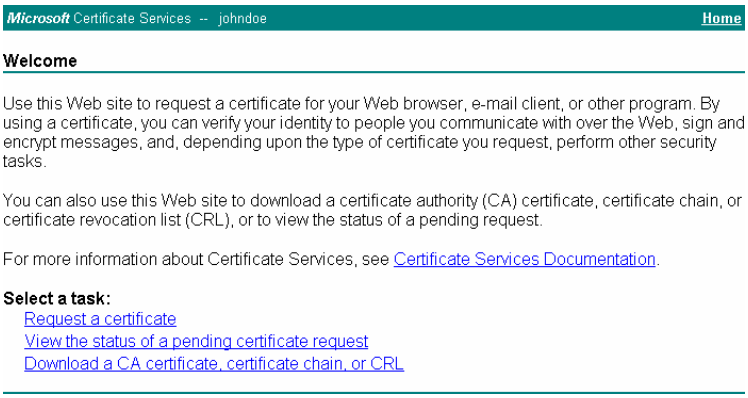

Microsoft Certificate Services -- johndoe
Home
Welcome
Use this Web site to request a certificate for your Web browser, e-mail client, or other program. By using a certificate, you can verify your identity to people you communicate with over the Web, sign and encrypt messages, and, depending upon the type of certificate you request, perform other security tasks.
You can also use this Web site to download a certificate authority (CA) certificate, certificate chain, or certificate revocation list (CRL), or to view the status of a pending request.
For more information about Certificate Services, see Certificate Services Documentation.
Select a task:
Request a certificate
View the status of a pending certificate request
Download a CA certificate, certificate chain, or CRL

Figure 5-78 Certificate Services Welcome Screen

Tap the "**Request a certificate"** task link.

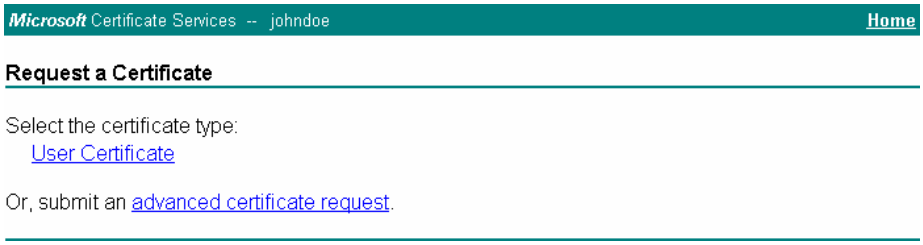


Figure 5-79 Request a Certificate Screen

Tap on the "**advanced certificate request"** link.

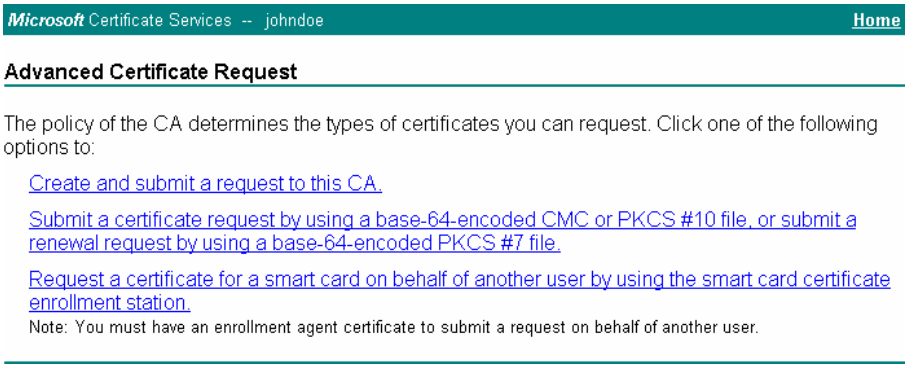

Microsoft Certificate Services -- johndoe
Home
Advanced Certificate Request
The policy of the CA determines the types of certificates you can request. Click one of the following options to:
Create and submit a request to this CA.
Submit a certificate request by using a base-64-encoded CMC or PKCS #10 file, or submit a renewal request by using a base-64-encoded PKCS #7 file.
Request a certificate for a smart card on behalf of another user by using the smart card certificate enrollment station.
Note: You must have an enrollment agent certificate to submit a request on behalf of another user.

Figure 5-80 Advanced Certificate Request Screen

Tap on the "**Create and submit a request to this CA"** link.

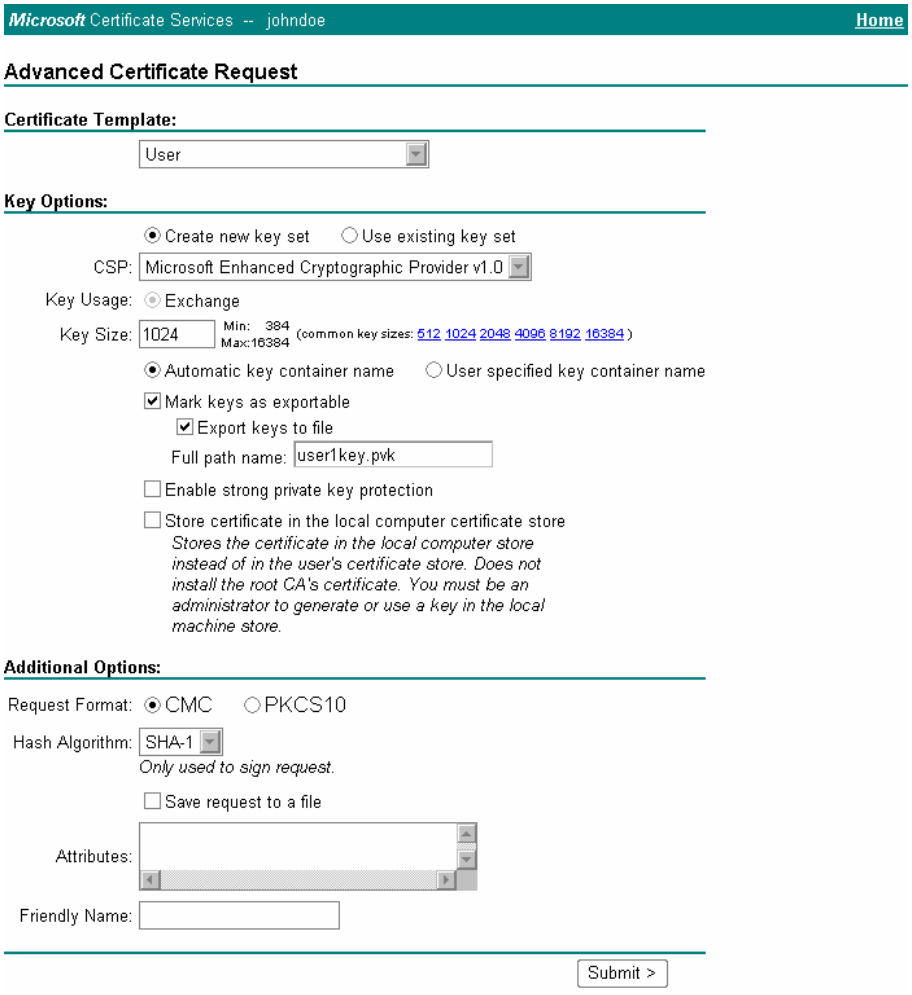


Figure 5-81 Advanced Certificate Details

For the Certificate Template, select **User**.

Check the “Mark keys as exportable” and the “Export keys to file” checkboxes.

Type the full path on the local PC where the private key is to be copied. Also specify the private key filename.

⚠	Be sure to note the name used for the private key file, for example MX7USER.PVK. The certificate file created later in this process must be given the same name, for example, MX7USER.CER.

DO NOT check “Enable strong private key protection”.

Make any other desired changes and tap the “Submit” button.

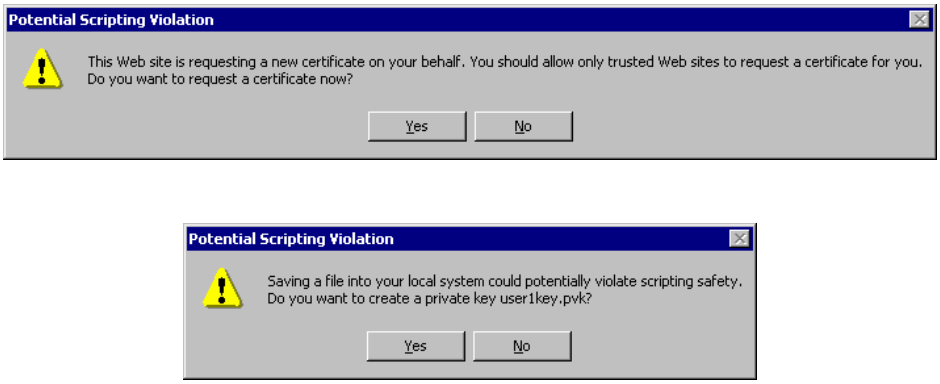

Potential Scripting Violation
This Web site is requesting a new certificate on your behalf. You should allow only trusted Web sites to request a certificate for you. Do you want to request a certificate now?
Yes
No
Potential Scripting Violation
Saving a file into your local system could potentially violate scripting safety. Do you want to create a private key user1key.pvk?
Yes
No

Figure 5-82 Script Warnings

If any script notifications occur, tap the "Yes" button to continue the certificate request.

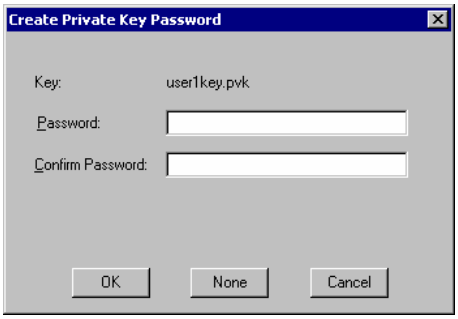


Figure 5-83 Script Warnings

When prompted for the private key password:

- Tap "None" if you do not wish to use a password, *or*
- Enter and confirm your desired password then tap "OK".

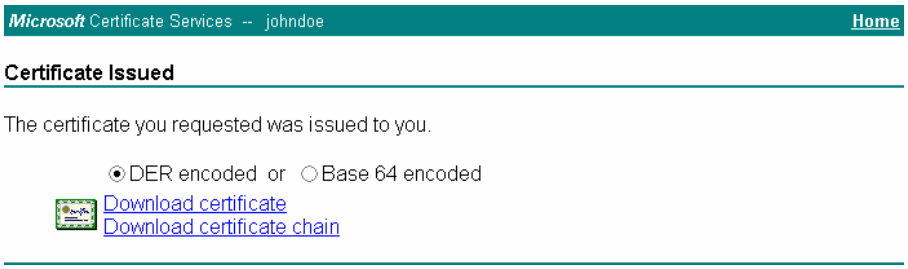


Figure 5-84 Certificate Issued

Tap the **Download certificate** link.

File Download
Some files can harm your computer. If the file information below looks suspicious, or you do not fully trust the source, do not open or save this file.
File name: certnew.cer
File type: Security Certificate
From: 100.100.100.100
This type of file could harm your computer if it contains malicious code.
Would you like to open the file or save it to your computer?
Open
Save
Cancel
More Info
Always ask before opening this type of file

Figure 5-85 Certificate Download Security Warning

Tap **Save** to download and store the user certificate to the PC.

Keep track of the name and location of the certificate as the file name and location is required in later steps.

The private key file is also downloaded and saved during this process.

⚠	Be sure use the same name for the certificate file as was used for the private key file. For example, it the private key was saved as MX7USER.PVK then the certificate file created must be given the same name, for example, MX7USER.CER.

Installing a User Certificate on the Mobile Device (WPA-TLS Only)

Copy the certificate and private key files to the mobile device. Import the certificate by navigating to **Start | Settings | Control Panel | Certificates**.

Select “My Certificates” from the pull down list.

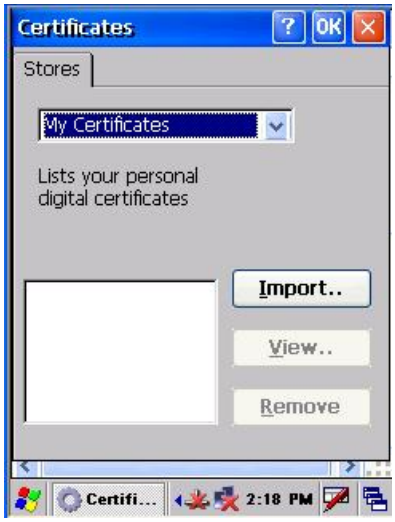


Figure 5-86 Certificates

Tap the “Import” button.

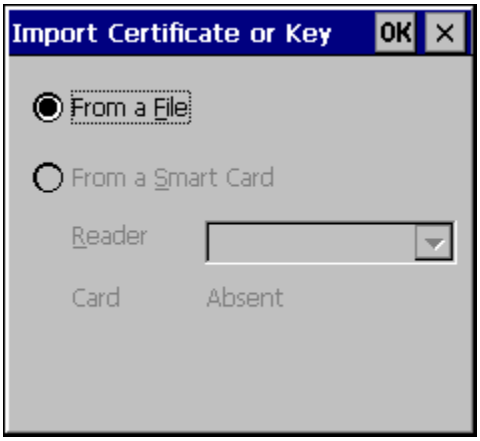


Figure 5-87 Import Certificate

Make sure “From a File” is selected and tap OK.

Figure 5-88 Browsing to Certificate Location

Using the explorer buttons, browse to the location where you copied the certificate, select the certificate desired and tap OK.

The certificate is now shown in the list.

Figure 5-89 Certificate Listing

Highlight the certificate you just imported and tap the **View**. . button.

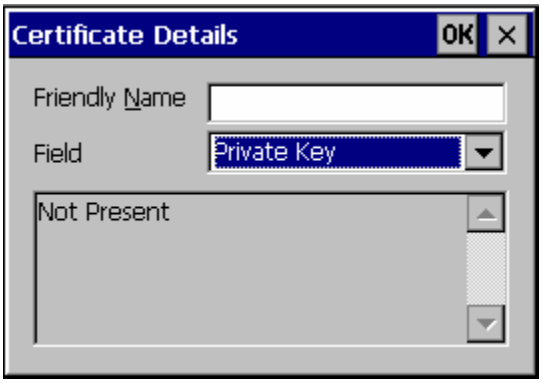


Figure 5-90 Private Key Not Present

From the **Field** pull down menu, select "Private Key.

- If the private key is present, the process is complete.
- If the private key is not present, import the private key.

To import the private key, tap OK to return to the Certificates screen.

Tap import.

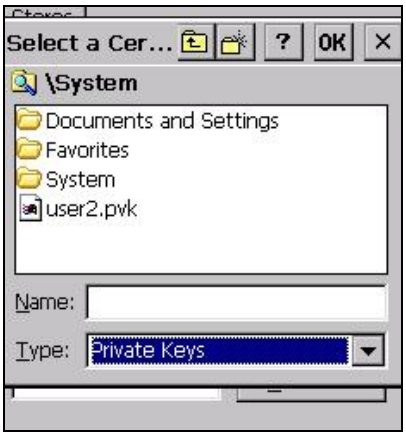


Figure 5-91 Browsing to Private Key Location

Using the explorer buttons, browse to the location where you copied the private key file, change the Type pull down list to "Private Keys", select the certificate desired and tap OK.

Enter the password for the certificate if appropriate.

Tap **View** to see the certificate details again.

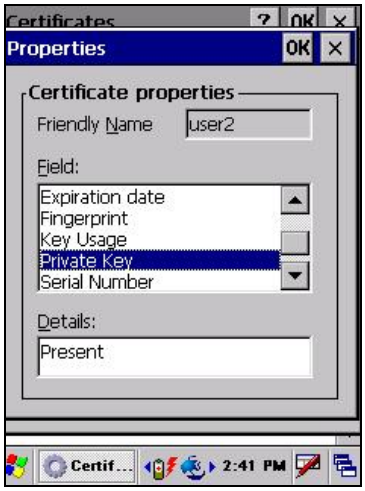


Figure 5-92 Private Key Present

The private key should now say “Present”. If it does not, there is a problem. Possible items to check:

- Make sure the certificate was generated with a separate private key file, as shown earlier in this section. If the certificate was not generated with a separate private key file, generate a new certificate and follow the import process again.
- Make sure the certificate and private key file have the same name, for example mx7user.cer for the certificate and mx7user.pvk for the private key file. If the file names are not the same, rename the private key file and import it again.

IEEE 802.11g Wireless LAN Configuration Utility

Access: **WiFi toolbar icon** **or** **Start | Programs | Radio Config Utility**

WiFi icon in Toolbar

The Radio Config Utility can be used to set the radio power management, antenna diversity and roaming profiles. Currently, LXE recommends using the default values.

The WiFi utility is installed upon each cold reset and warm reset and the icon is minimized to the toolbar.

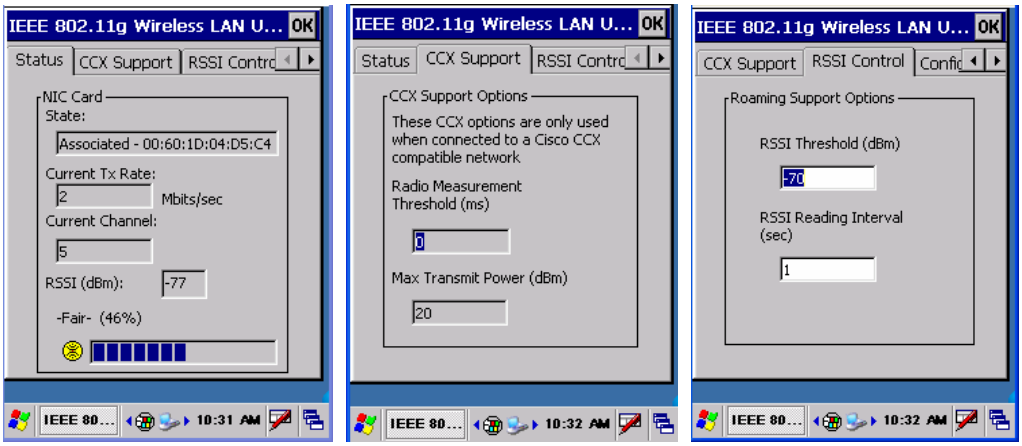


Figure 5-93 802.11g WiFi Configuration Utility Menus - Status, CCX, RSSI

The **Status** screen displays the current status of the radio, current data rate, the current AP channel that the radio is operating on, RSSI threshold and signal strength. These values cannot be changed by the user.

The **CCX Support** options are only populated when the MX7 is connected to a Cisco CCX compatible network or AP. Radio Measurement Threshold and Max Transmit Power values cannot be changed by the user.

The **RSSI Control** panel allows the user to set roaming support options. RSSI Threshold default is -70. RSSI Reading Interval is 1 sec. When the threshold reaches -70, the mobile device begins searching for a stronger AP signal every second until it locates an AP with a stronger signal.

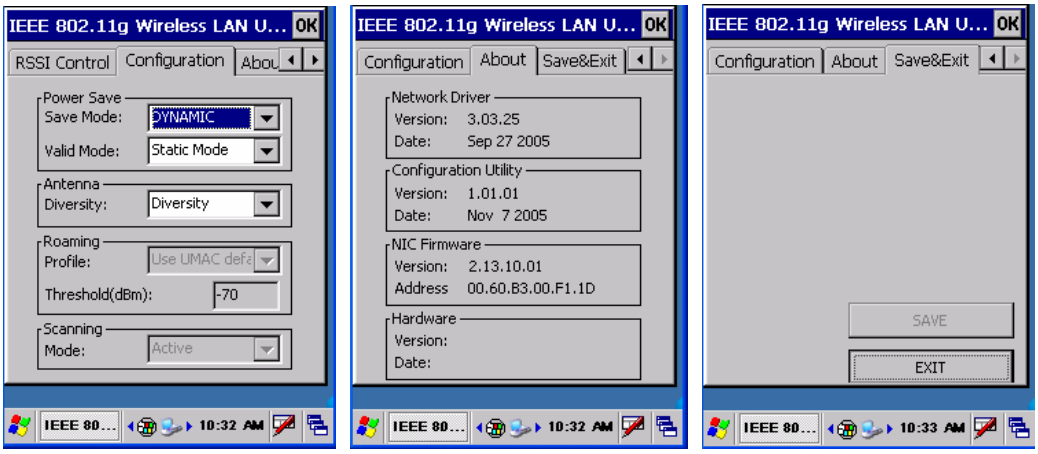


Figure 5-94 802.11g WiFi Configuration Utility Menus - Conf, About, Save&Exit

Configuration default options :

Power Save	Save Mode/Dynamic; Valid Mode/Static Mode. Dynamic save mode sets the radio to allow it to enter Power Save mode. LXE does not recommend using Maximum save mode.
Antenna	Diversity
Roaming	Profile displayed and greyed out; Threshold populated by RSSI Control panel setting
Scanning	Mode displayed and greyed out

The **About** screen displays version information. The values cannot be edited by the user.

Save&Exit buttons: The Save button is greyed out if there have been no changes made to the 802.11g parameters since the last reboot. If WiFi changes have been made, tap the Save button and then tap OK to save the changes. The WiFi icon minimizes to the taskbar. Tap the Exit button to close the WiFi utility and the WiFi icon is removed from the taskbar. LXE recommends the WiFi icon be visible in the taskbar at all times.

If the WiFi utility is closed accidentally you can *either* perform a Warm Reset to restart the WiFi utility *or* tap Start | Programs | Radio Config Utility.

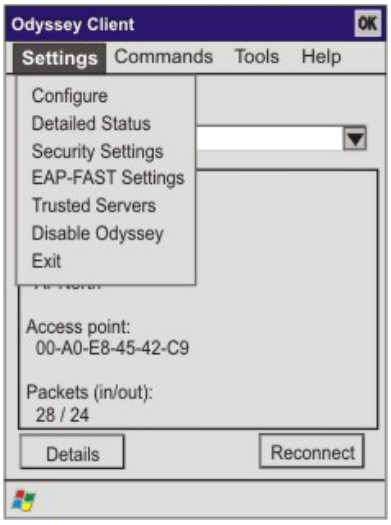
Wireless Zero Config Utility

Odyssey Client

The WZC utility has an icon in the toolbar that looks like networked computers with a red X through them, indicating the application is available but not used for current radio connection. To use the Wireless Zero Config Utility with the Odyssey Client, the Odyssey Client must be deliberately disabled by the user.

Note: LXE recommends using the Funk Odyssey client to configure the Odyssey Client radio. Wireless Zero Config icon is not recommended for configuring the radio as it cannot be used to configure all supported security protocols.

To use Wireless Zero Config, first open the Odyssey Client Utility. Start the Odyssey client configuration by tapping the Odyssey Client icon on the desktop or in the taskbar at the bottom right corner of the screen.



Tap the **Disable Odyssey** option on the Settings menu.

Odyssey is disabled immediately and the Wireless Zero Config utility begins.

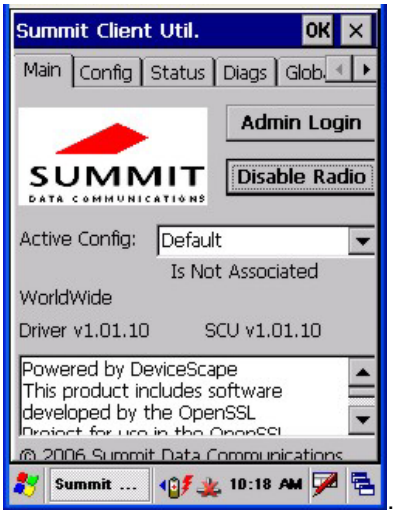
Summit Client

The WZC utility has an icon in the toolbar that looks like networked computers with a red X through them, indicating that Wireless Zero Config application is enabled and the MX7 is not connected to a network. *LXE does not recommend use of the Wireless Zero Configuration Utility for configuring the radio as it cannot be used to configure all supported security protocols.*

You can use either the Wireless Zero Configuration Utility or the Summit Client Utility to connect to your network.

LXE recommends using the Summit Client Utility to manage the radio.

To use Wireless Zero Config, first open the Summit Client Utility.



1. Select **ThirdPartyConfig** in the Active Config drop down box.
2. A message appears that a Power Cycle is required to make settings activate properly. Tap **OK**.
3. Tap the **Disable Radio** button to remove the connection to the Summit Client Utility. The text on the button changes to Enable Radio.
4. Tap the **Power** button to place the MX7 in **Suspend**, then tap the Power button to **wake the MX7** from Suspend mode.

The Wireless Zero Config utility begins.

Appendix A Key Maps

Introduction

Remember :

“Sticky” keys are also known as “second” function keys.

Ctl/Ctrl, Alt, Shft, Blue and Orange keys are “sticky keys”. Sticky keys do not need to be held down before pressing the next (or desired) key. It is valid to use combined modifiers on specific keys.

Note: The key mapping in this appendix relates to the physical keypad. See section titled “Input Panel” for the Virtual (or Soft) Keypad used with the stylus.

55-Key Alphanumeric Keymaps

ANSI / CE Keypad

When using a sequence of keys that includes a sticky key, press the sticky key first, release it, then press the rest of the key sequence.

When using a sequence of keys that includes the Orange or Blue keys, press the color key first then the rest of the key sequence.

Alphabetic keys default to lower case letters. Press the Shft key, then the alphabetic key for an uppercase letter.

When the computer boots, the default condition of Caps (or CapsLock) is Off. The Caps (or CapsLock) condition can be toggled with Blue plus Tab key sequence.

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Caps Lock	
Power / Suspend							Power [4]
Field Exit (default VK_PAUSE) *MAP=Mappable*	MAP	MAP			MAP		Diamond#1
Volume Adjust Mode	x	x					Scan Key [5] or V

[4] Tapping the Power key when in any sticky mode (Blue, Orange, Shift, etc) either turns the device On (when Off) or places it in Suspend (when active).

[5] Orange+Scan (and Blue+V) enters Volume Adjust Mode. Use Up Arrow and Down Arrow to adjust volume. Press any other key but Up Arrow or Down Arrow to exit Adjust Mode.

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Caps Lock	
Display Backlight Brightness Adjust Mode	x						Scan Key [6]
Toggle Blue Mode							Blue
Toggle Orange Mode							Orange
Toggle Shift Mode							Shft
Alt							Alt
Control							Ctl
Scan							Scan Key
Esc	x						Alt
Space							Spc
Enter							Enter
CapsLock (Toggle)	x						Tab
Back Space		x					Spc
Tab							Tab
BackTab		x					Tab
Up Arrow							Up Arrow
Down Arrow							Down Arrow
Right Arrow	x						Up Arrow
Left Arrow	x						Down Arrow
Insert	x	x					I (letter i) *or* Ctl
Delete							Del
Home					x		Down Arrow
End					x		Up Arrow
Page Up		x					Up Arrow
Page Down		x					Down Arrow
F1							F1
F2							F2
F3							F3
F4							F4
F5							F5
F6		x					F1
F7		x					F2
F8		x					F3
F9		x					F4
F10		x					F5
F11	x						F1

[6] Blue+Scan enters Backlight Brightness Adjust Mode. Use the Up Arrow and Down Arrow to adjust brightness. Press any other key but Up Arrow or Down Arrow to exit Adjust Mode.

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Caps Lock	
F12	x						F2
F13	x						F3
F14	x						F4
F15	x						F5
F16					x		F1
F17					x		F2
F18					x		F3
F19					x		F4
F20					x		F5
F21		x			x		F1
F22		x			x		F2
F23		x			x		F3
F24		x			x		F4
a							A
b							B
c							C
d							D
e							E
f							F
g							G
h							H
i							I
j							J
k							K
l							L
m							M
n							N
o							O
p							P
q							Q
r							R
s							S
t							T
u							U
v							V
w							W
x							X
y							Y
z							Z
A					x		A

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Caps Lock	
B					x		B
C					x		C
D					x		D
E					x		E
F					x		F
G					x		G
H					x		H
I					x		I
J					x		J
K					x		K
L					x		L
M					x		M
N					x		N
O					x		O
P					x		P
Q					x		Q
R					x		R
S					x		S
T					x		T
U					x		U
V					x		V
W					x		W
X					x		X
Y					x		Y
Z					x		Z
1							1
2							2
3							3
4							4
5							5
6							6
7							7
8							8
9							9
0							0
. period *or* . (period)		x x					DEL *or* K
<	x						G
[	x						Y

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Caps Lock	
]	x						Z
>	x						H
=	x						T
{	x						W
}	x						X
/	x						J
-	x						Spc
+	x						Del
* (asterisk)		x			x		l (letter i) *or* 8
: (colon)		x					D
; (semicolon)		x					F
. (period)		x					K
?		x					L
` (accent)		x					N
_ (underscore)		x					M
, (comma)		x					J
‘ (apostrophe)		x					H
~ (tilde)		x					B
\		x					S
|		x					A
“		x					G
!		x			x		Q *or* 1
@		x			x		W *or* 2
#		x			x		E *or* 3
$		x			x		R *or* 4
%		x			x		T *or* 5
^		x			x		Y *or* 6

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Caps Lock	
&		x			x		U *or* 7
(		x			x		O *or* 9
)		x			x		P *or* 0 (zero)

5250 Key Map for the 55-Key Keypad

Legend	Explanation	Key Sequence
Attn	Attention	Ctl + A
Clr	Clear	Ctl + C
Del	Delete	Ctl + D
Dup	Duplicate	Ctl + U
E-Inp	Erase Input	Ctl + Q
Field Exit	Enter	Diamond 1
Fld –	Field Minus	Ctl + M
Fld +	Field Plus	Ctl + L
Ins	Insert	Ctl + I
NL	New Line	Ctl + N
SysReq	System	Ctl + S

Please refer to the “RFTerm Reference Guide” for further information about 5250 key functions on the mobile device.

32-Key Numeric-Alpha Keypad

When using a sequence of keys that require an alpha key, first press the Alph key. Use the Shft sticky key or the Caps key sequence (Blue+Tab) for upper case alphabetic characters.

Pressing the Alph key forces "Alpha" mode for the 2,3,4,5,6,7,8, and 9 keys. The 1 and 0 keys continue to place a 1 and 0 into the text field.

To create a combination of numbers and letters before pressing Enter, remember to tap the Alph key to toggle between Alpha and Numeric mode.

When using a sequence of keys that do not include the Alph key but does include a sticky key, press the sticky key first then the rest of the key sequence.

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Alpha	
Power / Suspend							Power [7]
Field Exit (default VK_PAUSE)	MAP				MAP		Diamond#1 *MAP=Mappable*
= *or* (	 x	x			MAP		Diamond#2 Default is MAP *MAP=Mappable*
! *or*)	 x	x			MAP		Diamond#3 Default is MAP *MAP=Mappable*
Volume Adjust Mode		x					Scan Key [8]
Display Backlight Brightness Adjust Mode	x						Scan Key [9]
Toggle Blue Mode							Blue
Toggle Orange Mode							Orange
Toggle Shift Mode							Shft
Toggle Alpha Mode							**Alph**
Alt Mode							Alt
Control Mode							Ctrl
Scan Mode							Scan Key
Esc	x						Alt
Space							Spc
Enter							Enter
CapsLock (Toggle)	x						Tab
Back Space		x					Spc
Tab							Tab

[7] Tapping the Power key when in any sticky mode (Blue, Orange, Shift, etc) either turns the device On (when Off) or places it in Suspend (when active).
[8] Orange+Scan enters Volume Adjust Mode. Use Up Arrow and Down Arrow to adjust volume. Press any other key but Up Arrow or Down Arrow to exit Adjust Mode.
[9] Blue+Scan enters Backlight Brightness Adjust Mode. Use the Up Arrow and Down Arrow to adjust brightness. Press any other key but Up Arrow or Down Arrow to exit Adjust Mode.

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Alpha	
BackTab		x					Tab
Up Arrow							Up Arrow
Down Arrow							Down Arrow
Right Arrow	x						Up Arrow
Left Arrow	x						Down Arrow
Insert		x					Ctrl
Delete							Del
Home					x		Down Arrow
End					x		Up Arrow
Page Up		x					Up Arrow
Page Down		x					Down Arrow
F1							F1
F2							F2
F3							F3
F4							F4
F5							F5
F6		x					F1
F7		x					F2
F8		x					F3
F9		x					F4
F10		x					F5
F11	x						F1
F12	x						F2
F13	x						F3
F14	x						F4
F15	x						F5
F16					x		F1
F17					x		F2
F18					x		F3
F19					x		F4
F20					x		F5
F21		x			x		F1
F22		x			x		F2
F23		x			x		F3
F24		x			x		F4
a						x	2
b						x	22
c						x	222
d						x	3
e						x	33
f						x	333

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Alpha	
g						x	4
h						x	44
i						x	444
j						x	5
k						x	55
l						x	555
m						x	6
n						x	66
o						x	666
p						x	7
q						x	77
r						x	777
s						x	7777
t						x	8
u						x	88
v						x	888
w						x	9
x						x	99
y						x	999
z						x	9999
A					x	x	2
B					x	x	22
C					x	x	222
D					x	x	3
E					x	x	33
F					x	x	333
G					x	x	4
H					x	x	44
I					x	x	444
J					x	x	5
K					x	x	55
L					x	x	555
M					x	x	6
N					x	x	66
O					x	x	666
P					x	x	7
Q					x	x	77
R					x	x	777
S					x	x	7777
T					x	x	8
U					x	x	88

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Alpha	
V					x	x	888
W					x	x	9
X					x	x	99
Y					x	x	999
Z					x	x	9999
1							1
2							2
3							3
4							4
5							5
6							6
7							7
8							8
9							9
0							0
. (period)		x					DEL
<	x						7
[	x	x					2 *or* 2
]	x	x					3 *or* 3
>	x						8
=		x					Diamond#2
{	x						4
}	x						5
/	x						1
-	x						Spc
+	x						Del
* (asterisk)		x			x		8 *or* Diamond#1
: (colon)		x					0
; (semicolon)	x						0
. (period)		x					Del
?		x					8
` (accent)	x						6
_ (underscore)		x					7
, (comma)		x					6
‘ (apostrophe)		x					Alph

To Get This MX7 Key / Function	Press These Keys and Then …						Press This Key
	Blue	Orange	Ctl	Alt	Shft	Alpha	
~ (tilde)	x						9
\		x					1
|		x					Alt
“	x						Alph
!		x			x		Diamond#3 *or* 1
@		x			x		2 *or* 5
#		x			x		3 *or* 4
$		x			x		9 *or* 4
%					x		5
^	x				x		6 *or* Ctrl
&					x		7
(	x				x		Diamond#2 *or* 9
)	x				x		Diamond#3 *or* 0 (zero)

Creating Custom Key Maps

Prerequisite: LXE MX7 SDK CD [MX7A504CE50SDK]

Introduction

A command-line compiler called KEYCOMP.EXE is provided on the MX7 SDK CD. Using this compiler, the System Administrator can convert a sample default key map text file into a custom key map text file which, when loaded onto the mobile device, can be chosen by the user to replace the default mobile device keymap and then switched back when they are finished using the customized keys. This custom key map file can be made to re-define the system return code for each of the 55-key keypad keys, key press or key press combinations. All keys, except the power key, can be re-mapped.

IMPORTANT – The keycomp utility included with the MX7 SDK is not the same as the one included with the MX3X SDK. This one only generates maps for the MX7.

Custom keymaps for the mobile device are created on a desktop PC using the command line compiler KEYCOMP.EXE. Keycomp processes the input keymap source file and outputs a registry text file.

Note: Each VK_code has a numeric value (for example, VK_F20 = hex 83), these are documented in the SDK include file WINUSER.H (from Microsoft). The numeric value is what needs to go into the registry. Whether the value is hex or decimal depends on the registry editor being used - the one in the mobile device can use either hex or decimal, but the desktop one used over ActiveSync that a developer may use requires hex.

Example:

KEYCOMP DEFAULT.KEY (writes KEYCOMP.REG to local directory)

Input File	→	Compiler	→	Text File
DEFAULT.KEY		KEYCOMP.EXE		KEYCOMP.REG

This output file should be renamed to **xxx.REG** (the suffix must remain REG), then copied to the mobile device over ActiveSync. Once the file is loaded on the mobile device, double-tap the file from the Windows CE Explorer desktop. This will run the REGLOAD utility to put it into the registry, and save the registry to non-volatile flash. The keymap is now a permanent part of the mobile device, and the REG file is no longer needed unless it is necessary to perform a cold boot; as cold booting returns the registry to factory defaults, and it will be necessary to double-tap the REG file again.

Once the keymap has been added to the registry, it should appear in the Keyboard control panel as the name given in the MAPNAME field in the key file. To activate the keymap, select the keymap from the popup menu, and close the control panel with the OK button. To return to the default keymap, select **Default** from the keymap popup and tap OK.

The compiler has three functional stages:

- First, the input file is read and parsed for any syntax errors. The data read is stored in internal tables.
- Second, the data parsed from the input file is validated to see that all of the items required by the keyboard driver for normal operation are present.
- Third and finally, the KEYCOMP.REG file is written out in the format required by the REGLOAD utility on the Windows CE device.

Keymap Source Format

The source file **DEFAULT.KEY** is supplied with the keymap compiler. This is the commented source for the default keymap **Default**. The comments in this file should make the majority of this document redundant. There is a copy of this file at the end of this section, in "Sample Input File**"**. This section should be read while referring to this sample source, for simplicity.

It is an important limitation that the keymap must have a 4, 5, or 6 digit numeric name; this is a limit of the Microsoft Windows CE layout manager.

The format of this file is familiar to anyone who has used .INI files under Windows. There is a section header in square brackets, followed by various values in the form *value=data*.

Lines beginning with a semicolon (;) or empty lines are ignored as comments. Spaces or tabs before or after the information are stripped off and ignored. Case is ignored in section names, value names, and value data.

*Note: Before connecting to a host using Remote Desktop Connection, go to **Start | Settings | Control Panel | Keyboard** and select **Default** from the keymap popup. Tap OK.*

COLxROWx Format

Note: There is no relationship between the physical layout COL/ROW of the keyboard / keypad and the COL/ROW listing in the key map file. The key map file represents the electrical layout, not the physical layout.

All keys are specified in COLxROWx format. In this format, the first x is the 1 or 2 digit column in the keymap, and the second x is the 1 or 2 digit row in the keymap. All rows and columns are enumerated starting with zero (0).

In the **MAP** section, the **COLxROWx** is the value name, and the values must be less than the **MAPROWS** and **MAPCOLS** specified in the **GENERAL** section.

In the **SPECIAL** section, the **COLxROWx** is the value data, and the values given can be outside the normal key map limits.

GENERAL Section

The first section is the **GENERAL** section. This contains the keymap name (all numerics), as well as the number of rows and columns in the keymap, and the algorithm for converting rows and columns to a data byte to go into the keymap table.

```
.
[General]
MAPDESC=Default
MAPNAME=00000409
MAPCNT=4
.
```

MAPDESC	Name of this map. This is what appears in the popup menu in the keyboard control panel.
MAPNAME	ID code of this map, for use with the internal Win32 APIs (which require a numeric value).
MAPCNT	Gives the number of MAP sections (and hence keymap tables) in this source file.
MAPCOLS	Number of columns in each keymap table. This is defined by the hardware keyboard.

MAPROWS	Number of rows in each keymap table. This is defined by the hardware keyboard.
ALGOR	Defines the algorithm for converting row/column to internal scan code. Current values are: MX3X MX7 [MX7 is scancode = ((column << 3) + row)]

Note: The field MAPDESC *needs to be unique, but* MAPNAME *does not.*

SPECIAL Section

```
.
[Special]
KEYSHIFT=COL8ROW0
KEYALT=COL9ROW0
.
```

The second section is the **SPECIAL** section, which contains the row and column definitions for certain modifier keys which must be processed independent of the overall keymap. Currently, these are only modifier keys.

The only recognized names are: **KEYSHIFT**, **KEYALT**, **KEY2ND**, and **KEYCONTROL**, and these specify the row and column of these 4 specific modifier keys, in COLxROWx format. Note the row and column for these keys can be outside the keymap limits specified in the **GENERAL** section, since these are not loaded as part of the keymap proper.

MAP Section

```
.
[Map]
MAP=MAP_NORMAL
;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=VK_ESCAPE
COL0ROW1=VK_F1
.
```

There will be several (4 to 7) **MAP** sections, each defining the keymap for a given combination of modifier keys. The keyboard driver requires keymaps for normal (no modifiers), SHIFT only, 2ND only, and 2ND-SHIFT combined.

The CTRL modifier and ALT modifier do not have individual keymaps; the keystrokes are passed to the operating system, which is allowed to parse these keys according to Microsoft specifications (for example, ALT-keys are defined to only pulldown menus, with no other function).

The only recognized value names are **MAP** and **COLxROWx** (defining a key code). The only valid values for **MAP** are:

MAP_NORMAL	no modifier keys
MAP_2ND	2nd modifier only
MAP_SHIFT	shift modifier only
MAP_2NDSHIFT	2nd and shift modifiers together
MAP_NORMAL32	(MX7 only) no modifiers, 32-key map
MAP_ORANGE32	(MX7 only) orange modifier, 32-key map
MAP_BLUE32	(MX7 only) blue modifier, 32-key map
MAP_SHIFT32	(MX7 only) shift modifier, 32-key map

MAP_NORMAL55	(MX7 only) no modifiers, 55-key map
MAP_ORANGE55	(MX7 only) orange modifier, 55-key map
MAP_BLUE55	(MX7 only) blue modifier, 55-key map
MAP_SHIFT55	(MX7 only) shift modifier, 55-key map
MAP_ORANGESHFT	(MX7 only) orange and shift modifiers

In addition, certain keymaps are used for special adjustment functions within the keyboard driver, via the **CHANGE+mapname** specification:

MAP_VOLUM (or) MAP_VOLUME	special keymap for volume adjustment (not on MX7)
MAP_CONTR (or) MAP_CONTRAST	special keymap for contrast adjustment (not on MX7)
MAP_BRITE (or) MAP_BRIGHT	special keymap for brightness adjustment (not on MX7)

When these maps are selected, the keyboard driver handles the up arrow and down arrow as adjusting the particular parameter up and down, and any other key exits the adjustment state. Keys in these modes are handled completely inside the keyboard driver, and are not propagated to the operating system.

Key codes are defined by **COLxROWx=scancode**. **Scancode** has a number of options, as follows:

VK_code	any valid Windows VK code (see below for valid codes)
'x'	a single ASCII character ('A','b','1','@',' ', etc.)
SHIFT+VK_code	for a shifted VK code (see below for valid codes)
SHIFT+'x'	for a shifted ASCII character (should not be needed)
ACTION+code	special function key (valid codes listed below)
CHANGE+mapname	for modifier keys, change keymaps to mapname, as specified above
OPEN	an unused key position, does nothing when pressed

Valid **ACTION** codes are as follows:

SCAN1	Scan key 1 (left side of screen on mobile device)
SCAN2	Scan key 2 (right side of screen on mobile device)
SCAN3	Handle trigger button (unused on mobile device, but specified)
POWER	power button
BACKLIGHT	backlight on/off function

Note that specifying the power button in a different location will affect suspend/resume functions. The "15-second hold to force reboot" function is controlled by hardware, and will only work with the default power button.

Keycomp Error Messages

Most error messages will specify the line within the keymap source file where the error occurred.

Duplicate key

A COLxROWx code was found in a MAP table, but that COL/ROW already has a value assigned.

GENERAL section must come before MAP

The GENERAL section must come first, or at least before any MAP sections. The GENERAL section defines parameters which are needed to process Maps

Header line missing close bracket

The section header line must have square brackets before and after the section name

Header line missing open bracket

The section header line must have square brackets before and after the section name

Invalid ACTION code %s

The key scan code is specified as ACTION+code, but the ACTION code parsed is not recognized. The following values are valid: SCAN1, SCAN2, SCAN3, POWER, or BACKLIGHT.

Invalid keycode %s

The keycode parsed is not recognized. The following values are valid:

- VK code from the VK code table (below)
- 'x' where x is an ASCII code (e.g. 'A' or '#').
- OPEN for unused entries (will not do anything when pressed)

Invalid MAP value %s

The MAP value parsed is not one the following list: MAP_NORMAL, MAP_2ND, MAP_SHIFT, MAP_2NDSHF, MAP_2NDSHIFT, MAP_VOLUM, MAP_VOLUME, MAP_CONTR, MAP_CONTRAST, MAP_BRITE, or MAP_BRIGHT.

Invalid MAPCNT (1-%d valid)

The specified MAPCNT exceeds the limits of the KEYCOMP compiler.

Invalid MAPCOLS (1-%d valid)

The specified MAPCOLS exceeds the limits of the KEYCOMP compiler.

Invalid MAPROWS (1-%d valid)

The specified MAPROWS exceeds the limits of the KEYCOMP compiler.

Invalid ROWCOL format

A COLxROWx was expected, but the format was not correct. The only valid formats are: COLxROWx, COLxxROWx, COLxROWxx, or COLxxROWxx, where xx are decimal numeric digits (0-9).

Invalid scan code

The scan code parsed is not recognized. The scan code can take one of the following formats:

- VK_code
- 'x'
- SHIFT+VK_code
- SHIFT+'x'
- ACTION+code
- CHANGE+mapname
- OPEN

Invalid section name %s

The section name parsed is invalid. The only recognized names are: GENERAL, SPECIAL, or MAP

Invalid SHIFT code %s

The key scan code is specified as SHIFT+code, but the SHIFT code parsed is not recognized. The following values are valid:

- VK code from the VK code table (below)
- 'x' where x is an ASCII code (e.g. 'A', '3', or '#').

Invalid value %s in GENERAL section

The value name parsed is invalid for the GENERAL section. The recognized names are: MAPNAME, MAPCNT, MAPCOLS, MAPROWS, or ALGOR

Invalid value %s in MAP section

The value name parsed is not expected in the SPECIAL section. The only recognized names are: MAP and COLxxx.

Invalid value %s in SPECIAL section

The value name parsed is not expected in the SPECIAL section. The only recognized names are: KEYSHIFT, KEYALT, KEY2ND, and KEYCONTROL.

Invalid VK_ code %s

The VK code parsed is not recognized. See the VK Code Table (below) for valid values.

Map ended without MAP value

The MAP section must contain a MAP value, so the data fields can be parsed.

MAPNAME must be all numerics

Because of limitations in Microsoft Layout Manager, the map name must be all numeric (4, 5, or 6 digits). The name parsed did not fit this limitation.

No definition for map MAP_2ND

There is no 2nd keymap defined. The keyboard driver requires this keymap to be defined. This message comes from the post-parse validation, so no line # is specified.

No definition for map MAP_2NDSHIFT

There is no 2nd-SHIFT keymap defined. The keyboard driver requires this keymap to be defined. This message comes from the post-parse validation, so no line # is specified.

No definition for map MAP_NORMAL

There is no Normal keymap defined. The keyboard driver requires this keymap to be defined. This message comes from the post-parse validation, so no line # is specified.

No definition for map MAP_SHIFT

There is no SHIFT keymap defined. The keyboard driver requires this keymap to be defined. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.key2nd

No 2ND modifier key definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyalt

No ALT modifier key definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keycontrol

No CTRL modifier key definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keydnarrow

No down arrow definition was found The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keypower

No power key definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyscan1

No Scan Key 1 definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyscan2

No Scan Key 2 definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyscan3

No Trigger Button definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyshift

No SHIFT modifier key definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyuparrow

No up arrow definition was found The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No equal in value line

A value line must be of the form *value=data*. A value line was expected, but there was no equal in it. *(or)* A comment line did not begin with a semicolon (;).

No MAPNAME defined

There is no map name defined. The keyboard driver requires this name to be able to load the keymap tables. This message comes from the post-parse validation, so no line # is specified.

Scan code algorithm required

A COLxROWx data value was found before any ALGOR statement. ALGOR algorithm is parsed to decide how to encode COLxROWx into a keymap value.

Too many maps for specified MAPCNT

There are more MAP sections defined that the MAPCNT field specified.

Unknown scan code algorithm

The ALGOR algorithm specified is not one that KEYCOMP understands.

Unrecognized scancode algorithm %s

The ALGOR algorithm specified is not one that KEYCOMP understands.

Value outside of section

A value (defined as *value=data*) is only valid within a section (defined as *[section]*). A value line was found when a section header line was expected.

Sample Input File

```
;;-----------------------------------------------------
;; keymap file for MX7 default keyboard
;;
;;-----------------------------------------------------

;;-----------------------------------------------------
;; general parms give the size of arrays
;; all numeric values are decimal
;; these numbers are validated with the data below
;;              at compile time
;; MAPNAME must be 8-digits all numerics
;;-----------------------------------------------------
[General]
MAPDESC=Default
MAPNAME=00000409
MAPCNT=13
MAPCOLS=8
MAPROWS=8
ALGOR=MX3X

;;-----------------------------------------------------
;; ...still true for MX3X; not for MX7
;; ...but the old MX3X maps are included in the MX7
;;    map in case we ever merge...
;; special keys are accessed outside the map
;; this specifies the row and column
;; these should not need to change, but...
;;-----------------------------------------------------
[Special]
KEYSHIFT=COL8ROW0
KEYALT=COL9ROW0
KEY2ND=COL10ROW0
KEYCONTROL=COL11ROW0

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys with no modifier
;;-----------------------------------------------------
[Map]
MAP=MAP_NORMAL
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=VK_ESCAPE
COL0ROW1=VK_F1
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F2
COL0ROW4=VK_F5
COL0ROW5=VK_F7
COL0ROW6='8'
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0='Q'
COL1ROW1='9'
COL1ROW2=ACTION+SCAN3
COL1ROW3='T'
COL1ROW4='U'
COL1ROW5='4'
COL1ROW6='O'
COL1ROW7=ACTION+SCAN2
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0='A'
COL2ROW1=open
COL2ROW2='D'
COL2ROW3='G'
COL2ROW4='J'
COL2ROW5='1'
```

```
COL2ROW6='L'
COL2ROW7='3'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=' '
COL3ROW1=open
COL3ROW2='X'
COL3ROW3='V'
COL3ROW4='N'
COL3ROW5='0'
COL3ROW6=VK_LEFT
COL3ROW7=VK_TAB
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=VK_F9
COL4ROW1='S'
COL4ROW2=VK_RIGHT
COL4ROW3='F'
COL4ROW4='H'
COL4ROW5='K'
COL4ROW6='2'
COL4ROW7=VK_UP
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0='6'
COL5ROW1='Z'
COL5ROW2=VK_BACK
COL5ROW3='C'
COL5ROW4='B'
COL5ROW5='M'
COL5ROW6=VK_PERIOD
COL5ROW7=VK_DOWN
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=VK_F10
COL6ROW1='W'
COL6ROW2=VK_RETURN
COL6ROW3='R'
COL6ROW4='Y'
COL6ROW5='I'
COL6ROW6='5'
COL6ROW7='P'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0='E'
COL7ROW1=open
COL7ROW2=VK_F3
COL7ROW3=VK_F4
COL7ROW4=VK_F6
COL7ROW5='7'
COL7ROW6=VK_F8
COL7ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys with only 2ND
;;-----------------------------------------------------
[Map]
MAP=MAP_2ND
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=open
COL0ROW1=VK_CAPITAL
COL0ROW2=ACTION+POWER
COL0ROW3=VK_PAUSE
COL0ROW4=open
COL0ROW5=open
COL0ROW6=VK_HYPHEN
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=SHIFT+'1'
COL1ROW1=SHIFT+VK_EQUAL
COL1ROW2=ACTION+SCAN3
COL1ROW3=SHIFT+'5'
COL1ROW4=SHIFT+'7'
COL1ROW5=VK_EQUAL
COL1ROW6=SHIFT+'9'
COL1ROW7=ACTION+SCAN2
;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
COL2ROW0=SHIFT+VK_BACKSLASH
COL2ROW1=open
COL2ROW2=SHIFT+VK_SEMICOLON
COL2ROW3=SHIFT+VK_APOSTROPHE
COL2ROW4=VK_COMMA
COL2ROW5=VK_LBRACKET
COL2ROW6=SHIFT+VK_SLASH
COL2ROW7=SHIFT+VK_PERIOD
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=open
COL3ROW1=open
COL3ROW2=open
COL3ROW3=open
COL3ROW4=VK_BACKQUOTE
COL3ROW5=SHIFT+VK_COMMA
COL3ROW6=VK_HOME
COL3ROW7=SHIFT+VK_TAB
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=open
COL4ROW1=VK_BACKSLASH
COL4ROW2=VK_END
COL4ROW3=VK_SEMICOLON
COL4ROW4=VK_APOSTROPHE
COL4ROW5=VK_PERIOD
COL4ROW6=VK_RBRACKET
COL4ROW7=VK_PRIOR
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=SHIFT+VK_RBRACKET
COL5ROW1=open
COL5ROW2=VK_INSERT
COL5ROW3=open
COL5ROW4=SHIFT+VK_BACKQUOTE
COL5ROW5=SHIFT+VK_HYPHEN
COL5ROW6=VK_DELETE
COL5ROW7=VK_NEXT
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=ACTION+BACKLIGHT
COL6ROW1=SHIFT+'2'
COL6ROW2=open
COL6ROW3=SHIFT+'4'
COL6ROW4=SHIFT+'6'
COL6ROW5=SHIFT+'8'
COL6ROW6=SHIFT+VK_LBRACKET
COL6ROW7=SHIFT+'0'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=SHIFT+'3'
COL7ROW1=open
COL7ROW2=open
COL7ROW3=open
COL7ROW4=CHANGE+MAP_CONTRAST
COL7ROW5=VK_SLASH
COL7ROW6=CHANGE+MAP_VOLUME
COL7ROW7=open

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys with 2ND and SHIFT
;;-----------------------------------------------------
[Map]
MAP=MAP_2NDSHIFT
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=open
COL0ROW1=VK_F11
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F12
COL0ROW4=open
COL0ROW5=open
COL0ROW6='8'
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=open
COL1ROW1='9'
COL1ROW2=ACTION+SCAN3
COL1ROW3=open
```

```
COL1ROW4=open
COL1ROW5='4'
COL1ROW6=open
COL1ROW7=ACTION+SCAN2
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=open
COL2ROW1=open
COL2ROW2=open
COL2ROW3=open
COL2ROW4=open
COL2ROW5='1'
COL2ROW6=open
COL2ROW7='3'
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=open
COL3ROW1=open
COL3ROW2=open
COL3ROW3=open
COL3ROW4=open
COL3ROW5='0'
COL3ROW6=open
COL3ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=open
COL4ROW1=open
COL4ROW2=open
COL4ROW3=open
COL4ROW4=open
COL4ROW5=open
COL4ROW6='2'
COL4ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0='6'
COL5ROW1=open
COL5ROW2=open
COL5ROW3=open
COL5ROW4=open
COL5ROW5=open
COL5ROW6=open
COL5ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=open
COL6ROW1=open
COL6ROW2=open
COL6ROW3=open
COL6ROW4=open
COL6ROW5=open
COL6ROW6='5'
COL6ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=open
COL7ROW1=open
COL7ROW2=SHIFT+VK_PAUSE
COL7ROW3=VK_SCROLL
COL7ROW4=VK_SNAPSHOT
COL7ROW5='7'
COL7ROW6=open
COL7ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys with only SHIFT
;;-----------------------------------------------------
[Map]
MAP=MAP_SHIFT
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=SHIFT+VK_ESCAPE
COL0ROW1=SHIFT+VK_F1
COL0ROW2=ACTION+POWER
COL0ROW3=SHIFT+VK_F2
COL0ROW4=SHIFT+VK_F5
COL0ROW5=SHIFT+VK_F7
COL0ROW6=SHIFT+'8'
```

```
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=SHIFT+'Q'
COL1ROW1=SHIFT+'9'
COL1ROW2=ACTION+SCAN3
COL1ROW3=SHIFT+'T'
COL1ROW4=SHIFT+'U'
COL1ROW5=SHIFT+'4'
COL1ROW6=SHIFT+'O'
COL1ROW7=ACTION+SCAN2
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=SHIFT+'A'
COL2ROW1=open
COL2ROW2=SHIFT+'D'
COL2ROW3=SHIFT+'G'
COL2ROW4=SHIFT+'J'
COL2ROW5=SHIFT+'1'
COL2ROW6=SHIFT+'L'
COL2ROW7=SHIFT+'3'
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=SHIFT+' '
COL3ROW1=open
COL3ROW2=SHIFT+'X'
COL3ROW3=SHIFT+'V'
COL3ROW4=SHIFT+'N'
COL3ROW5=SHIFT+'0'
COL3ROW6=SHIFT+VK_LEFT
COL3ROW7=SHIFT+VK_TAB
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=SHIFT+VK_F9
COL4ROW1=SHIFT+'S'
COL4ROW2=SHIFT+VK_RIGHT
COL4ROW3=SHIFT+'F'
COL4ROW4=SHIFT+'H'
COL4ROW5=SHIFT+'K'
COL4ROW6=SHIFT+'2'
COL4ROW7=SHIFT+VK_UP
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=SHIFT+'6'
COL5ROW1=SHIFT+'Z'
COL5ROW2=SHIFT+VK_BACK
COL5ROW3=SHIFT+'C'
COL5ROW4=SHIFT+'B'
COL5ROW5=SHIFT+'M'
COL5ROW6=SHIFT+VK_PERIOD
COL5ROW7=SHIFT+VK_DOWN
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=SHIFT+VK_F10
COL6ROW1=SHIFT+'W'
COL6ROW2=SHIFT+VK_RETURN
COL6ROW3=SHIFT+'R'
COL6ROW4=SHIFT+'Y'
COL6ROW5=SHIFT+'I'
COL6ROW6=SHIFT+'5'
COL6ROW7=SHIFT+'P'
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=SHIFT+'E'
COL7ROW1=open
COL7ROW2=SHIFT+VK_F3
COL7ROW3=SHIFT+VK_F4
COL7ROW4=SHIFT+VK_F6
COL7ROW5=SHIFT+'7'
COL7ROW6=SHIFT+VK_F8
COL7ROW7=open

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for unmodified keys on the MX7
;; 32-key keypad
;;-----------------------------------------------------
[Map]
MAP=MAP_NORMAL32
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=KY_PROG1
```

```
COL0ROW1=VK_F1
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F2
COL0ROW4=VK_F5
COL0ROW5=VK_RETURN
COL0ROW6='2'
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=open
COL1ROW1=open
COL1ROW2=open
COL1ROW3=VK_SPACE
COL1ROW4=open
COL1ROW5=open
COL1ROW6=open
COL1ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0='4'
COL2ROW1=open
COL2ROW2=open
COL2ROW3=open
COL2ROW4='9'
COL2ROW5=open
COL2ROW6=open
COL2ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=VK_SHIFT
COL3ROW1=open
COL3ROW2=VK_DELETE
COL3ROW3=VK_CONTROL
COL3ROW4=open
COL3ROW5=open
COL3ROW6=open
COL3ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0='1'
COL4ROW1=open
COL4ROW2=open
COL4ROW3='7'
COL4ROW4='8'
COL4ROW5=open
COL4ROW6=open
COL4ROW7=VK_DOWN
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=open
COL5ROW1=KY_PROG2
COL5ROW2=VK_TAB
COL5ROW3='5'
COL5ROW4=open
COL5ROW5=open
COL5ROW6=open
COL5ROW7=VK_UP
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0='3'
COL6ROW1=ACTION+KY_ALPHA
COL6ROW2=open
COL6ROW3='0'
COL6ROW4=open
COL6ROW5=open
COL6ROW6=open
COL6ROW7=VK_MENU
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0='6'
COL7ROW1=KY_PROG3
COL7ROW2=VK_F3
COL7ROW3=VK_F4
COL7ROW4=open
COL7ROW5=KY_ORANGE
COL7ROW6=KY_BLUE
COL7ROW7=open

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys modified with ORANGE
```

```
;; on the MX7 32-key keypad
;;-----------------------------------------------------
[Map]
MAP=MAP_ORANGE32
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=SHIFT+'8'
COL0ROW1=VK_F6
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F7
COL0ROW4=VK_F10
COL0ROW5=open
COL0ROW6=VK_LBRACKET
COL0ROW7=CHANGE+MAP_VOLUME
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=open
COL1ROW1=open
COL1ROW2=open
COL1ROW3=VK_BACK
COL1ROW4=open
COL1ROW5=open
COL1ROW6=open
COL1ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=SHIFT+'3'
COL2ROW1=open
COL2ROW2=open
COL2ROW3=open
COL2ROW4=SHIFT+'4'
COL2ROW5=open
COL2ROW6=open
COL2ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=VK_SHIFT
COL3ROW1=open
COL3ROW2=VK_PERIOD
COL3ROW3=VK_INSERT
COL3ROW4=open
COL3ROW5=open
COL3ROW6=open
COL3ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=VK_BACKSLASH
COL4ROW1=open
COL4ROW2=open
COL4ROW3=SHIFT+VK_HYPHEN
COL4ROW4=SHIFT+VK_SLASH
COL4ROW5=open
COL4ROW6=open
COL4ROW7=VK_NEXT
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=open
COL5ROW1=VK_EQUAL
COL5ROW2=SHIFT+VK_TAB
COL5ROW3=SHIFT+'2'
COL5ROW4=open
COL5ROW5=open
COL5ROW6=open
COL5ROW7=VK_PRIOR
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=VK_RBRACKET
COL6ROW1=VK_APOSTROPHE
COL6ROW2=open
COL6ROW3=SHIFT+VK_SEMICOLON
COL6ROW4=open
COL6ROW5=open
COL6ROW6=open
COL6ROW7=SHIFT+VK_BACKSLASH
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=VK_COMMA
COL7ROW1=SHIFT+'1'
COL7ROW2=VK_F8
COL7ROW3=VK_F9
COL7ROW4=open
COL7ROW5=KY_ORANGE
COL7ROW6=KY_BLUE
COL7ROW7=open
```

```
;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys on the MX7 32-key keypad
;; modified with BLUE
;;-----------------------------------------------------
[Map]
MAP=MAP_BLUE32
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=KY_PROG1B
COL0ROW1=VK_F11
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F12
COL0ROW4=VK_F15
COL0ROW5=open
COL0ROW6=VK_LBRACKET
COL0ROW7=CHANGE+MAP_BRITE
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=open
COL1ROW1=open
COL1ROW2=open
COL1ROW3=VK_HYPHEN
COL1ROW4=open
COL1ROW5=open
COL1ROW6=open
COL1ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=SHIFT+VK_LBRACKET
COL2ROW1=open
COL2ROW2=open
COL2ROW3=open
COL2ROW4=SHIFT+VK_BACKQUOTE
COL2ROW5=open
COL2ROW6=open
COL2ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=VK_SHIFT
COL3ROW1=open
COL3ROW2=SHIFT+VK_EQUAL
COL3ROW3=SHIFT+'6'
COL3ROW4=open
COL3ROW5=open
COL3ROW6=open
COL3ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=VK_SLASH
COL4ROW1=open
COL4ROW2=open
COL4ROW3=SHIFT+VK_COMMA
COL4ROW4=SHIFT+VK_PERIOD
COL4ROW5=open
COL4ROW6=open
COL4ROW7=VK_LEFT
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=open
COL5ROW1=SHIFT+'9'
COL5ROW2=VK_CAPITAL
COL5ROW3=SHIFT+VK_RBRACKET
COL5ROW4=open
COL5ROW5=open
COL5ROW6=open
COL5ROW7=VK_RIGHT
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=VK_RBRACKET
COL6ROW1=SHIFT+VK_APOSTROPHE
COL6ROW2=open
COL6ROW3=VK_SEMICOLON
COL6ROW4=open
COL6ROW5=open
COL6ROW6=open
COL6ROW7=VK_ESCAPE
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=VK_BACKQUOTE
COL7ROW1=SHIFT+'0'
```

```
COL7ROW2=VK_F13
COL7ROW3=VK_F14
COL7ROW4=open
COL7ROW5=KY_ORANGE
COL7ROW6=KY_BLUE
COL7ROW7=open

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys on the MX7 32-key keypad
;; modified with SHIFT
;;-----------------------------------------------------
[Map]
MAP=MAP_SHIFT32
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=KY_PROG1S
COL0ROW1=VK_F16
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F17
COL0ROW4=VK_F20
COL0ROW5=open
COL0ROW6=SHIFT+'2'
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=open
COL1ROW1=open
COL1ROW2=open
COL1ROW3=VK_SPACE
COL1ROW4=open
COL1ROW5=open
COL1ROW6=open
COL1ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=SHIFT+'4'
COL2ROW1=open
COL2ROW2=open
COL2ROW3=open
COL2ROW4=SHIFT+'9'
COL2ROW5=open
COL2ROW6=open
COL2ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=VK_SHIFT
COL3ROW1=open
COL3ROW2=open
COL3ROW3=open
COL3ROW4=open
COL3ROW5=open
COL3ROW6=open
COL3ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=SHIFT+'1'
COL4ROW1=open
COL4ROW2=open
COL4ROW3=SHIFT+'7'
COL4ROW4=SHIFT+'8'
COL4ROW5=open
COL4ROW6=open
COL4ROW7=VK_HOME
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=open
COL5ROW1=KY_PROG2S
COL5ROW2=open
COL5ROW3=SHIFT+'5'
COL5ROW4=open
COL5ROW5=open
COL5ROW6=open
COL5ROW7=VK_END
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=SHIFT+'3'
COL6ROW1=open
COL6ROW2=open
COL6ROW3=SHIFT+'0'
COL6ROW4=open
```

```
COL6ROW5=open
COL6ROW6=open
COL6ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=SHIFT+'6'
COL7ROW1=KY_PROG3S
COL7ROW2=VK_F18
COL7ROW3=VK_F19
COL7ROW4=open
COL7ROW5=KY_ORANGE
COL7ROW6=KY_BLUE
COL7ROW7=open

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for unmodified keys on the
;; MX7 55-key keypad
;;-----------------------------------------------------
[Map]
MAP=MAP_NORMAL55
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=KY_PROG1
COL0ROW1=VK_F1
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F2
COL0ROW4=VK_F5
COL0ROW5=open
COL0ROW6='8'
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0='Q'
COL1ROW1='9'
COL1ROW2=open
COL1ROW3='T'
COL1ROW4='U'
COL1ROW5='4'
COL1ROW6='O'
COL1ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0='A'
COL2ROW1=open
COL2ROW2='D'
COL2ROW3='G'
COL2ROW4='J'
COL2ROW5='1'
COL2ROW6='L'
COL2ROW7='3'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=' '
COL3ROW1=open
COL3ROW2='X'
COL3ROW3='V'
COL3ROW4='N'
COL3ROW5='0'
COL3ROW6=open
COL3ROW7=VK_TAB
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=open
COL4ROW1='S'
COL4ROW2=VK_DELETE
COL4ROW3='F'
COL4ROW4='H'
COL4ROW5='K'
COL4ROW6='2'
COL4ROW7=VK_DOWN
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0='6'
COL5ROW1='Z'
COL5ROW2=VK_MENU
COL5ROW3='C'
COL5ROW4='B'
COL5ROW5='M'
COL5ROW6=open
COL5ROW7=VK_UP
```

```
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=open
COL6ROW1='W'
COL6ROW2=VK_RETURN
COL6ROW3='R'
COL6ROW4='Y'
COL6ROW5='I'
COL6ROW6='5'
COL6ROW7='P'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0='E'
COL7ROW1=VK_SHIFT
COL7ROW2=VK_F3
COL7ROW3=VK_F4
COL7ROW4='7'
COL7ROW5=KY_ORANGE
COL7ROW6=KY_BLUE
COL7ROW7=VK_CONTROL

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys with only SHIFT
;;-----------------------------------------------------
[Map]
MAP=MAP_ORANGE55
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=KY_PROG1O
COL0ROW1=VK_F6
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F7
COL0ROW4=VK_F10
COL0ROW5=open
COL0ROW6=open
COL0ROW7=CHANGE+MAP_VOLUME
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=SHIFT+'1'
COL1ROW1=open
COL1ROW2=open
COL1ROW3=SHIFT+'5'
COL1ROW4=SHIFT+'7'
COL1ROW5=open
COL1ROW6=SHIFT+'9'
COL1ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=SHIFT+VK_BACKSLASH
COL2ROW1=open
COL2ROW2=SHIFT+VK_SEMICOLON
COL2ROW3=SHIFT+VK_APOSTROPHE
COL2ROW4=VK_COMMA
COL2ROW5=open
COL2ROW6=SHIFT+VK_SLASH
COL2ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=VK_BACK
COL3ROW1=open
COL3ROW2=open
COL3ROW3=open
COL3ROW4=VK_BACKQUOTE
COL3ROW5=open
COL3ROW6=open
COL3ROW7=SHIFT+VK_TAB
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=open
COL4ROW1=VK_BACKSLASH
COL4ROW2=VK_PERIOD
COL4ROW3=VK_SEMICOLON
COL4ROW4=VK_APOSTROPHE
COL4ROW5=VK_PERIOD
COL4ROW6=open
COL4ROW7=VK_NEXT
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=open
COL5ROW1=open
COL5ROW2=open
```

```
COL5ROW3=open
COL5ROW4=SHIFT+VK_BACKQUOTE
COL5ROW5=SHIFT+VK_HYPHEN
COL5ROW6=open
COL5ROW7=VK_PRIOR
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=open
COL6ROW1=SHIFT+'2'
COL6ROW2=open
COL6ROW3=SHIFT+'4'
COL6ROW4=SHIFT+'6'
COL6ROW5=SHIFT+'8'
COL6ROW6=open
COL6ROW7=SHIFT+'0'
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=SHIFT+'3'
COL7ROW1=VK_SHIFT
COL7ROW2=VK_F8
COL7ROW3=VK_F9
COL7ROW4=open
COL7ROW5=KY_ORANGE
COL7ROW6=KY_BLUE
COL7ROW7=VK_INSERT

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys on the MX7 55-key keypad
;; modified with BLUE
;;-----------------------------------------------------
[Map]
MAP=MAP_BLUE55
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=KY_PROG1B
COL0ROW1=VK_F11
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F12
COL0ROW4=VK_F15
COL0ROW5=open
COL0ROW6=open
COL0ROW7=CHANGE+MAP_BRITE
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=open
COL1ROW1=open
COL1ROW2=open
COL1ROW3=VK_EQUAL
COL1ROW4=open
COL1ROW5=open
COL1ROW6=open
COL1ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=open
COL2ROW1=open
COL2ROW2=open
COL2ROW3=SHIFT+VK_COMMA
COL2ROW4=VK_SLASH
COL2ROW5=open
COL2ROW6=open
COL2ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=VK_HYPHEN
COL3ROW1=open
COL3ROW2=SHIFT+VK_RBRACKET
COL3ROW3=CHANGE+MAP_VOLUME
COL3ROW4=open
COL3ROW5=open
COL3ROW6=open
COL3ROW7=VK_CAPITAL
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=open
COL4ROW1=open
COL4ROW2=SHIFT+VK_EQUAL
COL4ROW3=open
COL4ROW4=SHIFT+VK_PERIOD
COL4ROW5=open
```

```
COL4ROW6=open
COL4ROW7=VK_LEFT
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=open
COL5ROW1=VK_RBRACKET
COL5ROW2=VK_ESCAPE
COL5ROW3=open
COL5ROW4=open
COL5ROW5=open
COL5ROW6=open
COL5ROW7=VK_RIGHT
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=open
COL6ROW1=SHIFT+VK_LBRACKET
COL6ROW2=open
COL6ROW3=open
COL6ROW4=VK_LBRACKET
COL6ROW5=VK_INSERT
COL6ROW6=open
COL6ROW7=SHIFT+VK_EQUAL
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=open
COL7ROW1=VK_SHIFT
COL7ROW2=VK_F13
COL7ROW3=VK_F14
COL7ROW4=open
COL7ROW5=KY_ORANGE
COL7ROW6=KY_BLUE
COL7ROW7=open

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys on the MX7 55-key keypad
;; modified with SHIFT
;;-----------------------------------------------------
[Map]
MAP=MAP_SHIFT55
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=KY_PROG1S
COL0ROW1=VK_F16
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F17
COL0ROW4=VK_F20
COL0ROW5=open
COL0ROW6=SHIFT+'8'
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=SHIFT+'Q'
COL1ROW1=SHIFT+'9'
COL1ROW2=open
COL1ROW3=SHIFT+'T'
COL1ROW4=SHIFT+'U'
COL1ROW5=SHIFT+'4'
COL1ROW6=SHIFT+'O'
COL1ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=SHIFT+'A'
COL2ROW1=open
COL2ROW2=SHIFT+'D'
COL2ROW3=SHIFT+'G'
COL2ROW4=SHIFT+'J'
COL2ROW5=SHIFT+'1'
COL2ROW6=SHIFT+'L'
COL2ROW7=SHIFT+'3'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=open
COL3ROW1=open
COL3ROW2=SHIFT+'X'
COL3ROW3=SHIFT+'V'
COL3ROW4=SHIFT+'N'
COL3ROW5=SHIFT+'0'
COL3ROW6=open
COL3ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
COL4ROW0=open
COL4ROW1=SHIFT+'S'
COL4ROW2=open
COL4ROW3=SHIFT+'F'
COL4ROW4=SHIFT+'H'
COL4ROW5=SHIFT+'K'
COL4ROW6=SHIFT+'2'
COL4ROW7=VK_HOME
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=SHIFT+'6'
COL5ROW1=SHIFT+'Z'
COL5ROW2=open
COL5ROW3=SHIFT+'C'
COL5ROW4=SHIFT+'B'
COL5ROW5=SHIFT+'M'
COL5ROW6=open
COL5ROW7=VK_END
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=open
COL6ROW1=SHIFT+'W'
COL6ROW2=open
COL6ROW3=SHIFT+'R'
COL6ROW4=SHIFT+'Y'
COL6ROW5=SHIFT+'I'
COL6ROW6=SHIFT+'5'
COL6ROW7=SHIFT+'P'
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=SHIFT+'E'
COL7ROW1=VK_SHIFT
COL7ROW2=VK_F18
COL7ROW3=VK_F19
COL7ROW4=SHIFT+'7'
COL7ROW5=KY_ORANGE
COL7ROW6=KY_BLUE
COL7ROW7=VK_CONTROL

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys with only SHIFT
;;-----------------------------------------------------
[Map]
MAP=MAP_ORANGESHFT
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=open
COL0ROW1=VK_F21
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F22
COL0ROW4=open
COL0ROW5=open
COL0ROW6=open
COL0ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=open
COL1ROW1=open
COL1ROW2=open
COL1ROW3=open
COL1ROW4=open
COL1ROW5=open
COL1ROW6=open
COL1ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=open
COL2ROW1=open
COL2ROW2=open
COL2ROW3=open
COL2ROW4=open
COL2ROW5=open
COL2ROW6=open
COL2ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=open
COL3ROW1=open
COL3ROW2=open
COL3ROW3=open
```

```
COL3ROW4=open
COL3ROW5=open
COL3ROW6=open
COL3ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=open
COL4ROW1=open
COL4ROW2=open
COL4ROW3=open
COL4ROW4=open
COL4ROW5=open
COL4ROW6=open
COL4ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=open
COL5ROW1=open
COL5ROW2=open
COL5ROW3=open
COL5ROW4=open
COL5ROW5=open
COL5ROW6=open
COL5ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=open
COL6ROW1=open
COL6ROW2=open
COL6ROW3=open
COL6ROW4=open
COL6ROW5=open
COL6ROW6=open
COL6ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=open
COL7ROW1=open
COL7ROW2=VK_F23
COL7ROW3=VK_F24
COL7ROW4=open
COL7ROW5=open
COL7ROW6=open
COL7ROW7=open
```

Sample Output File

```
[HKEY_CURRENT_USER\Keyboard Layout\Keymaps\Default]
"HKL"="00000409"
"Head"=hex: 0D,08,08,40,00,00,02,27,2F,07,0F,0A,40,48,50,58
"Map0"=hex:\
        1B,70,DF,71,74,76,38,87,51,39,89,54,55,34,4F,88,\
        41,00,44,47,4A,31,4C,33,20,00,58,56,4E,30,25,09,\
        78,53,27,46,48,4B,32,26,36,5A,08,43,42,4D,BE,28,\
        79,57,0D,52,59,49,35,50,45,00,72,73,75,37,77,00
"Flag0"=hex:\
        00,00,A0,00,00,00,00,A0,00,00,A0,00,00,00,00,A0,\
        00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
        00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
        00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
"Map1"=hex:\
        00,14,DF,13,00,00,BD,87,31,BB,89,35,37,BB,39,88,\
        DC,00,BA,DE,BC,DB,BF,BE,00,00,00,00,C0,BC,24,09,\
        00,DC,23,BA,DE,BE,DD,21,DD,00,2D,00,C0,BD,2E,22,\
        8A,32,00,34,36,38,DB,30,33,00,00,00,00,BF,00,00
"Flag1"=hex:\
        00,00,A0,00,00,00,00,A0,10,10,A0,10,10,00,10,A0,\
        10,00,10,10,00,00,10,10,00,00,00,00,00,10,00,10,\
        00,00,00,00,00,00,00,00,10,00,00,00,10,10,00,00,\
        A0,10,00,10,10,10,10,10,00,00,00,8E,00,8D,00
"Map2"=hex:\
        00,7A,DF,7B,00,00,38,87,00,39,89,00,00,34,00,88,\
        00,00,00,00,00,31,00,33,00,00,00,00,00,30,00,00,\
        00,00,00,00,00,00,32,00,36,00,00,00,00,00,00,00,\
        00,00,00,00,00,00,35,00,00,00,13,91,2C,37,00,00
"Flag2"=hex:\
        00,00,A0,00,00,00,00,A0,00,00,A0,00,00,00,00,A0,\
        00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
        00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
        00,00,00,00,00,00,00,00,00,00,10,00,00,00,00,00
"Map3"=hex:\
        1B,70,DF,71,74,76,38,87,51,39,89,54,55,34,4F,88,\
        41,00,44,47,4A,31,4C,33,20,00,58,56,4E,30,25,09,\
        78,53,27,46,48,4B,32,26,36,5A,08,43,42,4D,BE,28,\
        79,57,0D,52,59,49,35,50,45,00,72,73,75,37,77,00
"Flag3"=hex:\
        10,10,A0,10,10,10,10,A0,10,10,A0,10,10,10,10,A0,\
        10,00,10,10,10,10,10,10,10,00,10,10,10,10,10,10,\
        10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,\
        10,10,10,10,10,10,10,10,00,10,10,10,10,10,00
"Map4"=hex:\
        E9,70,DF,71,74,0D,32,87,00,00,00,20,00,00,00,00,\
        34,00,00,00,39,00,00,00,10,00,2E,11,00,00,00,00,\
        31,00,00,37,38,00,00,28,00,ED,09,35,00,00,00,26,\
        33,F1,00,30,00,00,00,12,36,EF,72,73,00,F2,F3,00
"Flag4"=hex:\
        00,00,A0,00,00,00,00,A0,00,00,00,00,00,00,00,00,\
        00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
        00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
        00,A0,00,00,00,00,00,00,00,00,00,00,00,00,00,00
"Map5"=hex:\
        38,75,DF,76,79,00,DB,00,00,00,00,08,00,00,00,00,\
        33,00,00,00,34,00,00,00,10,00,BE,2D,00,00,00,00,\
        DC,00,00,BD,BF,00,00,22,00,BB,09,32,00,00,00,21,\
        DD,DE,00,BA,00,00,00,DC,BC,31,77,78,00,F2,F3,00
"Flag5"=hex:\
        10,00,A0,00,00,00,00,8D,00,00,00,00,00,00,00,00,\
        10,00,00,00,10,00,00,00,00,00,00,00,00,00,00,00,\
        00,00,00,10,10,00,00,00,00,00,10,10,00,00,00,00,\
        00,00,00,10,00,00,00,10,00,10,00,00,00,00,00,00
"Map6"=hex:\
        EC,7A,DF,7B,7E,00,DB,00,00,00,00,BD,00,00,00,00,\
        DB,00,00,00,C0,00,00,00,10,00,BB,36,00,00,00,00,\
        BF,00,00,BC,BE,00,00,25,00,39,14,DD,00,00,00,27,\
        DD,DE,00,BA,00,00,00,1B,C0,30,7C,7D,00,F2,F3,00
"Flag6"=hex:\
        00,00,A0,00,00,00,00,8F,00,00,00,00,00,00,00,00,\
        10,00,00,00,10,00,00,00,00,00,10,10,00,00,00,00,\
        00,00,00,10,10,00,00,00,00,10,00,10,00,00,00,00,\
        00,10,00,00,00,00,00,00,10,00,00,00,00,00,00
```

```
"Map7"=hex:\
       EA,7F,DF,80,83,00,32,87,00,00,00,20,00,00,00,00,\
       34,00,00,00,39,00,00,00,10,00,00,00,00,00,00,00,\
       31,00,00,37,38,00,00,24,00,EE,00,35,00,00,00,23,\
       33,00,00,30,00,00,00,00,36,F0,81,82,00,F2,F3,00
"Flag7"=hex:\
       00,00,A0,00,00,00,10,A0,00,00,00,00,00,00,00,00,\
       10,00,00,00,10,00,00,00,00,00,00,00,00,00,00,00,\
       10,00,00,10,10,00,00,00,00,00,00,10,00,00,00,00,\
       10,00,00,10,00,00,00,00,10,00,00,00,00,00,00,00
"Map8"=hex:\
       E9,70,DF,71,74,00,38,87,51,39,00,54,55,34,4F,00,\
       41,00,44,47,4A,31,4C,33,20,00,58,56,4E,30,00,09,\
       00,53,2E,46,48,4B,32,28,36,5A,12,43,42,4D,00,26,\
       00,57,0D,52,59,49,35,50,45,10,72,73,37,F2,F3,11
"Flag8"=hex:\
       00,00,A0,00,00,00,00,A0,00,00,00,00,00,00,00,00,\
       00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
       00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
       00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
"Map9"=hex:\
       EB,75,DF,76,79,00,00,00,31,00,00,35,37,00,39,00,\
       DC,00,BA,DE,BC,00,BF,00,08,00,00,00,C0,00,00,09,\
       00,DC,BE,BA,DE,BE,00,22,00,00,00,00,C0,BD,00,21,\
       00,32,00,34,36,38,00,30,33,10,77,78,00,F2,F3,2D
"Flag9"=hex:\
       00,00,A0,00,00,00,00,8D,10,00,00,10,10,00,10,00,\
       10,00,10,10,00,00,10,00,00,00,00,00,00,00,00,10,\
       00,00,00,00,00,00,00,00,00,00,00,00,10,10,00,00,\
       00,10,00,10,10,10,00,10,10,00,00,00,00,00,00,00
"Map10"=hex:\
       EC,7A,DF,7B,7E,00,00,00,00,00,00,BB,00,00,00,00,\
       00,00,00,BC,BF,00,00,00,BD,00,DD,00,00,00,00,14,\
       00,00,BB,00,BE,00,00,25,00,DD,1B,00,00,00,00,27,\
       00,DB,00,00,DB,2D,00,BB,00,10,7C,7D,00,F2,F3,00
"Flag10"=hex:\
       00,00,A0,00,00,00,00,8F,00,00,00,00,00,00,00,00,\
       00,00,00,10,00,00,00,00,00,00,10,8D,00,00,00,00,\
       00,00,10,00,10,00,00,00,00,00,00,00,00,00,00,00,\
       00,10,00,00,00,00,00,10,00,00,00,00,00,00,00,00
"Map11"=hex:\
       EA,7F,DF,80,83,00,38,87,51,39,00,54,55,34,4F,00,\
       41,00,44,47,4A,31,4C,33,00,00,58,56,4E,30,00,00,\
       00,53,00,46,48,4B,32,24,36,5A,00,43,42,4D,00,23,\
       00,57,00,52,59,49,35,50,45,10,81,82,37,F2,F3,11
"Flag11"=hex:\
       00,00,A0,00,00,00,10,A0,10,10,00,10,10,10,10,00,\
       10,00,10,10,10,10,10,10,00,00,10,10,10,10,00,00,\
       00,10,00,10,10,10,10,00,10,10,00,10,10,10,00,00,\
       00,10,00,10,10,10,10,10,10,00,00,00,10,00,00,00
"Map12"=hex:\
       00,84,DF,85,00,00,00,00,00,00,00,00,00,00,00,00,\
       00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
       00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
       00,00,00,00,00,00,00,00,00,00,86,87,00,00,00,00
"Flag12"=hex:\
       00,00,A0,00,00,00,00,00,00,00,00,00,00,00,00,00,\
       00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
       00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
       00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
```

Appendix B Technical Specifications

Physical Specifications

Features		Specifications	Comments	
CPU		Intel Xscale operating at 400 MHz	32 bit CPU (with on-chip cache)	
Memory	RAM	128 MB SDRAM	20 MB available for programs and data	
Display	LCD	Transmissive Color – optimized for indoor use	Transmissive LCD with touchscreen. Customer Configurable Display LED Backlighting	
Mass Storage	Removable SD Card	128MB 32MB available for customer use	SD Flash Card FAT file system	
PCMCIA Interface		None		
Weights		Unit with radio, battery, SE1524ER scanner and handle	1.6 lbs (26.1 oz)	740g
		Unit with radio, battery, SE1524ER scanner and handstrap	1.4 lbs (22.6 oz)	640g
		Battery	4.3 oz	122g
		Radio - 2.4GHz USB 802.11b/g	0.35 oz	9.9g
		Radio – 2.4GHz CF 802.11b/g	.5 oz	15g
		SD Flash Card	1 oz	28g
External Connectors/Interface		RS-232 COM1 mini D serial port	20 Position “D” (female) Connector. Provides cabled connection to external devices such as an audio headset, printer, USB/power connection, RS-232/power connection.	
Dimensions		Length	8.8”	22.3 cm
		Width at display	3.4”	8.6 cm
		Width at handgrip	2.8”	7.1 cm
		Depth at Scanner	2”	5.1 cm
		Depth at Battery	1.7”	4.3 cm
Scanner		No Scanner Intermec EV-15 Linear Imager Symbol SE824 Short Range Symbol SE1524ER Lorax Symbol SE955 Short Range	Integrated SE955 replaced SE824 in July 2006.	

Features		Specifications	Comments
Batteries	Main	Li-Ion battery pack 7.4V 2.4Ah	In-Unit Chargeable or Externally Chargeable
	Backup (CMOS)	Internal Nickel Cadmium (NiCd) 1.42V max.	Automatically charges from main battery during normal operation. Requires AC power for re-charging. Memory operational for 24 hours when main battery is depleted. Minimal life expectancy is 2 years.
Radio	802.11 b/g LXE	2.4GHz (USB 2.0 device in PCMCIA Card)	Supports diversity. Dynamic control for power management.
	802.11 b/g LXE	2.4GHz (Compact Flash device in PCMCIA Adapter Card)	Supports diversity. Dynamic control for power management.

Display Specifications

Feature	Specification
Type	LCD – Active Transmissive Color / LED Backlight
Resolution	320 (Vertical) x 240 (Horizontal) pixels
Size	1/4 VGA portrait
Diagonal Viewing Area	3.5 in (8.9cm)
Dot Pitch	0.22mm
Dot Size	0.20mm x 0.20mm
Color Scale	Reflective – 256 colors

Environmental Specifications

MX7

Feature	Specification
Operating Temperature	14°F to 122°F (-10°C to 50°C)
Storage Temperature	-4°F to 158°F (-20°C to 70°C)
Water and Dust	IP54
Operating Humidity	Up to 90% non-condensing at 104°F (40°C)
Standards	See “MX7 User’s Guide”, Appendix B.
Contamination	Resistant to exposure to skin oil and other lubricants.
Vibration	Based on MIL Std 810D
ESD	8 kV air, 4kV direct contact

AC Wall Adapter

Feature	Specification
Input Power Switch	None
Power "ON" Indicator	None
Input Fusing	Thermal Fuse
Input Voltage	100VAC min – 240 VAC max
Input Frequency	50 - 60 Hz
Input Connector	North American wall plug, no ground
Output Connector	AC wall adapter has a 5.5mm barrel connector. This connects to the LXE cables which transition power to the 20 pin D connector.
Output Voltage	+12V, regulated
Output Current	0 Amps min, 1.25 Amps max
Operating Temperature	32 F to 100° F / -0° C to 40° C *The LXE-approved AC Power Adapter is only intended for use in a 25°C (77°F) maximum ambient temperature environment.*
Storage Temperature	-40° F to 180° F / -40° C to 80° C (fahrenheit degrees (temperature) = ((centigrade temperature)*9/5)+32)
Humidity	Operates in a relative humidity of 5 – 95% (non-condensing)

Radio Specifications

Odyssey Client

Bus Interface	USB Interface
Radio Frequencies	2.400GHz to 2.4835GHz
RF Data Rates	1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps
RF Power Level	18 dBm 64mW Max
Channels	1-11 FCC, 1-13 ETSI
Operating Temperature	see Environmental Specs
Storage Temperature	see Environmental Specs
Connectivity	TCP/IP, Ethernet, ODI
Diversity	Yes
Hotswapping	No

Summit Client

Bus Interface	16-bit Compact Flash Type I with 50-pin connector
Radio Frequencies	2.4 to 2.4897 GHz
RF Data Rates	1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps
RF Power Level	50 mW max.
Channels	1-11 FCC, 1-13 ETSI
Operating Temperature	see Environmental Specs
Storage Temperature	see Environmental Specs
Connectivity	TCP/IP, Ethernet, ODI
Diversity	Yes
Hotswapping	No

List of Valid VK Codes for CE

This is the list of codes parsed by KEYCOMP compiler. Refer to Microsoft Windows documentation for further clarification of the meaning of these key codes. Any VK keys not defined here are not valid for use under Windows CE .

VK_ADD	VK_F3	VK_NUMPAD9
VK_APOSTROPHE	VK_F4	VK_OEM_CLEAR
VK_APPS	VK_F5	VK_OFF
VK_ATTN	VK_F6	VK_PA1
VK_BACK	VK_F7	VK_PAUSE
VK_BACKQUOTE	VK_F8	VK_PERIOD
VK_BACKSLASH	VK_F9	VK_PLAY
VK_BROWSER_BACK	VK_FINAL	VK_PRINT
VK_BROWSER_FAVORITES	VK_HANGUL	VK_PRIOR
VK_BROWSER_FORWARD	VK_HANJA	VK_RBRACKET
VK_BROWSER_HOME	VK_HELP	VK_RBUTTON
VK_BROWSER_REFRESH	VK_HOME	VK_RCONTROL
VK_BROWSER_SEARCH	VK_HYPHEN	VK_RETURN
VK_BROWSER_STOP	VK_INSERT	VK_RIGHT
VK_CANCEL	VK_JUNJA	VK_RMENU
VK_CAPITAL	VK_KANA	VK_RSHIFT
VK_CLEAR	VK_KANJI	VK_RWIN
VK_COMMA	VK_LAUNCH_APP1	VK_SCROLL
VK_CONTROL	VK_LAUNCH_APP2	VK_SELECT
VK_CONVERT	VK_LAUNCH_MAIL	VK_SEMICOLON
VK_CRSEL	VK_LAUNCH_MEDIA_SELECT	VK_SEPARATOR
VK_DECIMAL	VK_LBRACKET	VK_SHIFT
VK_DELETE	VK_LBUTTON	VK_SLASH
VK_DIVIDE	VK_LCONTROL	VK_SLEEP
VK_DOWN	VK_LEFT	VK_SNAPSHOT
VK_END	VK_LMENU	VK_SPACE
VK_EQUAL	VK_LSHIFT	VK_SUBTRACT
VK_EREOF	VK_LWIN	VK_TAB
VK_ESCAPE	VK_MBUTTON	VK_UP
VK_EXECUTE	VK_MEDIA_NEXT_TRACK	VK_VOLUME_DOWN
VK_EXSEL	VK_MEDIA_PLAY_PAUSE	VK_VOLUME_MUTE
VK_F1	VK_MEDIA_PREV_TRACK	VK_VOLUME_UP
VK_F10	VK_MEDIA_STOP	VK_ZOOM
VK_F11	VK_MENU	
VK_F12	VK_MULTIPLY	
VK_F13	VK_NEXT	
VK_F14	VK_NOCONVERT	
VK_F15	VK_NONAME	
VK_F16	VK_NUMLOCK	
VK_F17	VK_NUMPAD0	
VK_F18	VK_NUMPAD1	
VK_F19	VK_NUMPAD2	
VK_F2	VK_NUMPAD3	
VK_F20	VK_NUMPAD4	
VK_F21	VK_NUMPAD5	
VK_F22	VK_NUMPAD6	
VK_F23	VK_NUMPAD7	
VK_F24	VK_NUMPAD8	

ASCII Control Codes

The following table lists ASCII Control codes in hexadecimal and their corresponding Control-key combinations.

Char	Hex	Control-Key	Control Action	
NUL	0	^@	NULL character	Ctrl-Shift-`
SOH	1	^A	Start Of Heading	VK_CONTROL (0x11) down VK_A (0x41) down WM_CHAR (0x1) VK_A (0x41) up VK_CONTROL (0x11) up
STX	2	^B	Start of TeXt	Ctrl-b
ETX	3	^C	End of TeXt	Ctrl-c
EOT	4	^D	End Of Transmission	Ctrl-d
ENQ	5	^E	ENQuiry	Ctrl-e
ACK	6	^F	ACKnowledge	Ctrl-f
BEL	7	^G	BELl, rings terminal bell	Ctrl-g
BS	8	^H	BackSpace (non-destructive)	Ctrl-h
HT	9	^I	Horizontal Tab (move to next tab position)	Ctrl-i
LF	a	^J	Line Feed	Ctrl-j
VT	b	^K	Vertical Tab	Ctrl-k
FF	c	^L	Form Feed	Ctrl-l
CR	d	^M	Carriage Return	Ctrl-m
SO	e	^N	Shift Out	Ctrl-n
SI	f	^O	Shift In	Ctrl-o
DLE	10	^P	Data Link Escape	Ctrl-p
DC1	11	^Q	Device Control 1, normally XON	Ctrl-q
DC2	12	^R	Device Control 2	Ctrl-r
DC3	13	^S	Device Control 3, normally XOFF	Ctrl-s
DC4	14	^T	Device Control 4	Ctrl-t
NAK	15	^U	Negative AcKnowledge	Ctrl-u
SYN	16	^V	SYNchronous idle	Ctrl-v
ETB	17	^W	End Transmission Block	Ctrl-w

Char	Hex	Control-Key	Control Action	
CAN	17	^X	CANcel line	Ctrl-x
EM	19	^Y	End of Medium	Ctrl-y
SUB	1a	^Z	SUBstitute	Ctrl-z
ESC	1b	^[	ESCape	VK_CONTROL (0x11)down VK_PACKET (0xe7) down WM_CHAR 0x1b VK_PACKET up VK_CONTROL up
FS	1c	^\	File Separator	VK_CONTROL (0x11)down VK_PACKET (0xe7) down WM_CHAR 0x1c VK_PACKET up VK_CONTROL up
GS	1d	^]	Group Separator	VK_CONTROL (0x11)down VK_PACKET (0xe7) down WM_CHAR 0x1d down WM_CHAR (0x1d) up VK_PACKET up VK_CONTROL up
RS	1e	^^	Record Separator	VK_CONTROL (0x11)down VK_SHIFT (0x10) down WM_CHAR 0x36 down WM_CHAR 0x36 up VK_SHIFT up VK_CONTROL up
US	1f	^_	Unit Separator	VK_CONTROL (0x11) down VK_SHIFT (0x10) down VK_PACKET (0xe7) down WM_CHAR 0x1f VK_PACKET (0xe7) up VK_SHIFT (0x10) up VK_CONTROL (0x11) up

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